CONTRACEPTIVE PRACTICES OF ADVANCED PRACTICE REGISTERED NURSES IN OUTPATIENT SETTINGS

Emily Elizabeth Radford Ryan

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Approved by:

SeonAe Yeo

Noreen Esposito

Angela Walling

ABSTRACT

Emily Elizabeth Radford Ryan: Contraceptive Practices of Advanced Practice Registered Nurses in Outpatient Settings
(Under the direction of SeonAe Yeo)

Long-acting reversible contraception methods (LARCs) are considered the most efficacious methods on the market but despite pervasive endorsements as first-line contraception from leading healthcare institutions, LARC use in the US remains low. The literature postulates provider behaviors and their individual contraceptive clinical practice may create difficulty accessing LARC methods for their patients, specifically when healthcare providers lack the knowledge and training required to insert or council patients on choosing LARC methods. This project aims to examine whether contraceptive clinical practice (CCP) pattern varies by graduate practice program preparation of the provider and explore factors related to routine counseling of LARC methods by providers.

Using a convenience sample of advanced practice registered nurses, identified through a data request made to The North Carolina Board of Nursing, and a modified version of the National Pregnancy and HIV/STI Prevention Survey, responses from 810 participants were analyzed. There were statistically significant differences among the CCP of primary care providers as compared to women's health providers across a variety of measures all of which both individually and collectively have the potential to affect the quality of contraceptive counseling and services provided.

While some paradigm shifts in healthcare occur rapidly, it is clear that the adoption of LARC methods in the primary care setting has had slower trajectory toward full incorporation. Despite that, we remain encouraged by the changes we have seen and the interest expressed by participants in learning more about LARC methods.

To Shane.

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LIST OF ABBREVIATIONS

AAP	American Academy of Pediatrics
ACA	Affordable Care Act
ACOG	American College of Obstetricians and Gynecologists
AGNP	Adult/Geriatric Nurse Practitioner
CCP	Contraceptive Clinical Practice
CDC	Centers for Disease Control and Prevention
CNM	Certified Nurse Midwife
Cu-IUD	Copper IUD (Paragard)
DOI	Diffusion of Innovation
ENG-Implant	Etongestrel-Implant (Nexplanon)
FNP	Family Nurse Practitioner
IUC	Intrauterine Contraception
LARC	Long Acting Reversible Contraception
LNG-IUS	Levonorgestrel Intrauterine System (Mirena, Skyla, Liletta, and Kyleena)
MEC	Medical Eligibility Criteria
NC	North Carolina
NP	Nurse Practitioner
ODUM	Howard W. Odum Institute for Research in Social Science
PNP	Pediatric Nurse Practitioner
QSEN	Quality and Safety Education for Nurses Initiative
WHO	World Health Organization
WHNP	Women's Health Nurse Practitioner

CHAPTER 1

INTRODUCTION

Long-acting reversible contraception methods (LARCs) are considered the most efficacious methods on the market but utilization among American women remains low, estimated at 11.6% compared to 25.9% for the pill and 15.3% for male condoms, while 10% used no method at all (Guttmacher Institute, 2016). In the United States, roughly half of all pregnancies each year are unintended; defined as a pregnancy that is either mistimed— where the woman did not wish to become pregnant but desires pregnancy in the future— or unwanted at the time of conception (Guttmacher Institute, 2015). Unintended pregnancies are divided into mistimed (27% of pregnancies) and unwanted (18% of pregnancies) (Guttmacher Institute, 2016). Mistimed pregnancies are those that are unplanned but occur in women reporting a desire to become pregnant in the future (Guttmacher Institute, 2016). Unwanted pregnancies are unplanned pregnancies that occur in women who report neither desiring pregnancy now or at any point in the future (Guttmacher Institute, 2016). Consequences of unintended pregnancies range from the increased risk of delaying prenatal care and related poor outcomes for mother and child, to economic concerns where unplanned pregnancies are known to cost federal and state taxpayers between $9.6 and $12.6 billion annually (Guttmacher Institute, 2015; Pickle, Wu, & Burbank-Schmitt, 2014). Despite pervasive endorsements as first-line contraception from leading healthcare institutions, LARC use in the US remains low (ACOG, 2011; ACOG, 2012; CDC, 2010; Ott & Sucato, 2014). Data from 2012, the most recent available, measuring the

most effective method of contraception used in the last month by women at risk for unintended pregnancy—those who are sexually active, not currently pregnant, postpartum, or otherwise infertile—lists LARC use at 11.6% compared to 25.9% for the pill and 15.3% for male condoms, while 10% used no method at all (Guttmacher Institute, 2016).

Unintended Pregnancy in North Carolina

The unintended pregnancy rate in North Carolina (NC) in 2010, the most recent data available, was 54% (Kost, 2015). In the same year, 74.8% of these unplanned births were publically funded through programs such as Medicaid, Children's Health Insurance Program, or Indian Health Services, again exceeding the national average of 68% (Kost, 2015). Furthermore, of the $858.3 million in expenditures, paid for by both the federal and state government, for unintended pregnancies, the state was responsible for covering $214.7 million (Sonfield & Kost, 2015). It is estimated the prevention or reduction of unintended pregnancies in North Carolina could save the state upward of $448 million dollars (Sonfield & Kost, 2015).

Potential Issues

Provider Behavior. While the specifics of provider behaviors as to contraceptive clinical practice in North Carolina have not yet been elucidated, and are in fact the particular concern of this project, there is ample data from various other state and national sources indicating providers may in many instances act as a barrier to LARC access. The literature postulates provider behaviors and their individual contraceptive clinical practice may create difficulty accessing LARC methods for their patients, specifically when healthcare providers lack the knowledge and training required to insert or council patients on choosing LARC methods (Dehlendorf, Levy, Ruskin, & Steinauer, 2010; Harper et al., 2012; Harper et al., 2008). Further presentation of evidence is put forth in the discussion of the available literature.

Rural vs. Urban Access. Of particular concern, studies have shown differences in LARC availability by rural and urban delineations in states such as Illinois and Wisconsin, where a survey of 862 rural primary care physicians found that many did not have training in IUD (87%) and implant (41%) placement (Lunde et al., 2014). In Texas, a survey of family planning providers at Title X clinics revealed that urban providers self-reported they were well trained in LARC insertion at higher rates than their rural counterparts (75% versus 57%) (Vaaler, Kalanges, Fonseca, & Castrucci, 2012). Rates of LARC use were also higher for patients seen at the urban clinics versus the rural clinics for IUDS, 7% vs. 5%, and implants, 1% vs. <1% (Vaaler et al., 2012). This led the authors to conclude that there is a disparity in access to LARC methods between rural and urban clinics and that these findings demonstrate both importance of LARC training for providers and also the potential impact provider's knowledge and attitudes about LARCs may have on patients choosing LARC methods (Lunde et al., 2014; Vaaler et al., 2012). Data such as this is relevant to the discussion of LARC access in NC since the 2010 census, the most recent data available, NC was classified as having the second largest rural population in the nation and in the 2014 census estimate, 80 of is 99 counties are classified as rural by having a population density of less than 250 people per square mile or less (Gray, 2015; U.S. Census Bureau, 2012).

The Role of the Nurse Practitioner

In NC, it has been estimated that 58% of NPs work in primary care settings (Spetz, Fraher, Li, & Bates, 2015). Furthermore, NPs, particularly those working in publicly funded clinics, which are known to serve populations at highest risk for unintended pregnancy, have been identified as essential providers of contraceptive services (Landry, Wei, & Frost, 2008).

Nurse practitioners have been identified as providing quality, primary care services equal to and in some measures exceeding that of physicians as measured by physiologic outcome measures, patient satisfaction, and cost (Swan, Ferguson, Chang, Larson, & Smaldone, 2015). Under the Quality and Safety Education for Nurses Initiative (QSEN) and the Core Competencies for Nurse Practitioners developed by the National Organization of Nurse Practitioner Faculties, both of which strongly emphasize the importance of possessing analytic skills for evaluating and providing evidence-based care, there is an expectation to perpetually improve one's practice (Cronenwett et al., 2007; Thomas et al., 2012). To meet this competency expectation, NPs must consistently work to grow their knowledge base and practice through the addition of new skills and adoption of new protocols and guidelines.

Providers & Contraceptive Counseling. The CDC recommends to counsel all patients about the full range and effectiveness of contraceptive options for which they are medically eligible" by their providers (CDC, 2013). In conjunction with the U.S. Office of Population Affairs in 2014, and updated in 2016, they released report called "Providing Quality Family Planning Services" (Gavin et al., 2014; Gavin & Pazol, 2016). This guidance is for all providers who provide contraceptive services- from primary care providers to OB/GYNs. In the report, is the recommendation that providers use a tiered approach when discussing contraceptive methods by starting with the most effective and first-line recommended methods first and working their way down to the least effective method (Gavin et al., 2014). In this way, the comprehensive contraception counseling aims to give women the information they need to choose the most appropriate contraception method for them based on a variety of factors including health history, lifestyle, and personal attitudes regarding potential side effects among others (Dehlendorf, Krajewski, & Borrero, 2014). A unique clinical situation is created by the intersection and

interaction of medical science with patient preference and personal beliefs due to the very personal nature of choosing contraception. This is not seen to the same degree, when providers counsel patients on medication options for blood pressure management where JNC-8 guidelines leave far less leeway in the treatment modality recommendations than the CDC MEC for contraception does. Provider's limited adherence to evidence-based guidelines regarding LARC methods has been implicated as a potential reason for their lower rates of use in the U.S. (Harper et al., 2013). The impact of contraceptive counseling is evident in multiple studies describing how selection of a new contraceptive method is largely influenced by provider behaviors, specifically mentioning or not mentioning certain methods, or directly recommending others (Bitzer et al., 2013; Dehlendorf et al., 2010; Harper, Brown, Foster-Rosales, & Raine, 2010). Contraceptive counseling is most effective when provided with evidence based recommendations, non-judgment, and clarity through which women may be empowered to choose the method which is most effective and easy for her for successful family planning.

Project Purpose

This project aims to identify contraceptive clinical practice trends among nurse practitioners in the North Carolina. Specifically, the objectives of the project are to identify clinician practice patterns and attitudes toward contraceptive care in the following ways:

1. To examine whether contraceptive clinical practice (CCP) pattern varies by graduate practice program preparation of the provider.
2. Explore factors related to routine counseling of LARC methods by providers.

The answers to these questions will also serve as an early needs assessment in evaluating current CCP among providers as to contraceptive counseling, current skill level for LARC insertion technique, and provider interest in receiving further training in LARC methods.

CHAPTER 2

LITERATURE REVIEW

Healthy People 2020, a public health initiative focused on reducing health disparities among Americans, made family planning one of its strategic objectives (Healthy People 2020, 2015). Goals include increasing the overall proportion of pregnancies that are planned and reducing the percentage of women who become pregnant despite using reversible forms of contraception (Healthy People 2020, 2015). In response to the widespread health and economic effects of unintended pregnancies, Healthy People 2020 (2015) lists improving pregnancy planning, spacing, and preventing unintended pregnancies as a goal. There is no better phrasing than that used by Pace et al., …"family planning protects the health of women, children and communities, [and] it is a quintessential primary care service" (Pace, Cohen, & Schwarz, 2011). LARC's superior effectiveness, shown in study after study, gives us a chance to use an upstream solution—access to the highest efficacy contraception—to address downstream problem, unintended pregnancy. This leads us to an inevitable, and proven conclusion—unintended pregnancies would be much less common if rates of LARC use were to increase among American women (Harper et al., 2015). Therefore, it is important to ask the question—what role can primary care providers (PCPs) play in a women's decision to use contraception and the receipt of family planning services among their patients?

To understand role LARC availability in primary care can play in reaching these goals, we have to first understand the sheer number of unintended pregnancies that occur while women

are using other methods of birth control and the lasting effects of these unintended pregnancies. This literature review will therefore first address the consequences of unintended pregnancies, public health and economic, then examine the historical context of LARC use in America which led to its decline in popularity and contributed to many of the pervasive misunderstandings providers still have about LARC use. Then we will present findings on LARC training rates among providers, provider behaviors that negatively impact LARC availability, and a possible solution to low training rates and provider misconceptions about LARC use—increasing attendance at post graduate training programs—and how the proposed project will provide data to help further this goal.

Consequences of High Unintended Pregnancy Rates

Public Health. Unintended pregnancies are a public health problem, which affect approximately 3 million pregnancies in the U.S. each year (Pickle et al., 2014). Studies show that women who have unplanned pregnancies are at increased risk of delaying prenatal care, experiencing maternal depression, and suffering physical violence during pregnancy (Joyce, Kaestner, & Korenman, 2000; Pickle et al., 2014). Meanwhile, their infants are more likely to have low birth weights and are at higher risk for birth defects (D'Angelo, Gilbert, Rochat, Santelli, & Herold, 2004; Kaye, 2012; Pickle et al., 2014). As these children grow, they are also more likely to live in poverty, experience adverse physical and psychological outcomes, and have lower educational attainment than their peers (Ng & Kaye, 2012; Pickle et al., 2014).

Economic. Simply stated, unintended pregnancies are expensive and taxpayers primarily shoulder this economic burden. Two separate economic studies estimated that unintended pregnancies cost taxpayers in excess of 11 billion dollars annually (Monea & Thomas, 2011; Sonfield, Kost, Gold, & Finer, 2011). A third attributes 2.5 billion of that total directly to

unintended pregnancies resulting from imperfect adherence to contraceptive methods (Trussell, 2007). It is estimated that if a little as 10% of women aged 20-29 switched from oral contraceptives to LARC methods the total savings would be $288 million per year (Monea & Thomas, 2011; Trussell et al., 2013).

Contraceptive Trends

Increasingly, primary care providers are providing contraceptive services to their patients in the U.S.—there were 11.5 million visits to primary care providers for contraceptive services in 2010 (Pickle et al., 2014). This number is expected to increase with the ACA and the mandate to cover contraception, though more recent numbers have not been available. In selecting contraceptive methods, providers and patients commonly select the pill, the patch, the vaginal ring, and male condoms. All of these methods have high typical-use, first year failure rates ranging from 18% for male condom to 9% for the pill (CDC, 2014). Of the unintended pregnancies, each year, only 5% of these occur in women using birth control consistently and correctly at each and every sexual encounter (Daniels, Daugherty, & Jones, 2014; Guttmacher Institute, 2015; Kavanaugh, Jerman, Ethier, & Moskosky, 2013). High typical-use failure rates are concerning because many women remain unaware that they are not using their chosen birth control methods in a way that would meet the definition of consistently and correctly. Statistically, in any given year, approximately 70% of the nearly 61 million U.S. women of childbearing age, 15-44 years, are at risk of experiencing an unintended pregnancy (Guttmacher Institute, 2015). In other words, there are 43 million women in need of adequate contraceptive counseling and services each year (Guttmacher Institute, 2016). Among these women, 18% will use contraceptive inconsistently and will make up 41% of unintended pregnancies, 14% will not use contraception at all or will have a gap in use that lasts for 1 months or longer and these

women will account for 54% of the unintended pregnancies that year (Guttmacher Institute, 2016). It is precisely the issue of inconsistent or intermittent use that puts women at risk and short acting reversible contraceptive methods such as the pill, patch, and vaginal ring allow for intermittent and inconsistent use by their very design and nature.

Long Acting Reversible Contraception Methods

When discussing LARC methods, it is important to clarify that the title describes two forms of intrauterine devices, non-hormonal and hormonal, and one type of hormonal implant. Collectively, LARC methods are known to provide highly effective, non-user dependent contraception (CDC, 2014). These methods include the non-hormonal Copper T 380A (Cu-IUD), the hormonal levonorgestril intrauterine systems (LNG-IUS), and the etonogestrel implant (ENG-Implant), Nexplanon. All of which have exceedingly low first year typical-use failure rates (CDC, 2014). Rates vary by LARC method, but each are considered as effective as permanent options, such as sterilization, but are reversible with rapid return to fertility upon discontinuation—0.05% for Nexplanon, 0.2% for LNG-IUS, and 0.8% for Cu-IUD (CDC, 2014). As such, current guidelines for contraceptives including ones by CDC, ACOG, and AAP universally promote LARC as the first-line contraceptive recommendation for almost all women excluding those with distorted uterine cavities (LNG-IUS and Cu-IUD), current breast cancer (LNG-IUS, Nexplanon), Cervical cancer awaiting treatment (LNG-IUS and Cu-IUD), endometrial cancer (LNG-IUS and Cu-IUD), gestational trophoblastic disease (LNG-IUS and Cu-IUD), and AIDS (LNG-IUS and Cu-IUD) (ACOG, 2012; CDC, 2010; Ott & Sucato, 2014). These recommendations are meant to guide contraceptive counseling such that women are presented with the most effective methods first and foremost, not dictate that all women must use choose to use these methods.

Intrauterine Contraception

Currently in the U.S there are five intrauterine contraception (IUC) devices available. These include the sole non-hormonal method, the Copper T 380A (Paraguard), and four levonorgestril secreting intrauterine systems (LNG-IUS): Mirena, Skyla, Liletta, and Kyleena (Bayer, 2016a; Bayer, 2016b; Bayer, 2016c; Merck, 2016; Odyssea Pharma, 2016; Teva Women's Health, 2014). Each of these methods may be placed by a trained health care provider in an outpatient setting and require minimal additional clinic expenditure for supplies beyond those already required for routine pelvic examinations.

Copper T 380A. The Copper T 380A IUD, approved for use for up to 10 years, is a non-hormonal, 32mm wide and 36mm tall polyethylene T-shaped copper-containing device made radio-opaque with the addition of barium sulfate (Teva Women's Health, 2014). The device has approximately 176mg of copper wire coiled along the vertical stem and an additional 68.7mg collar on each of the horizontal arms providing a total copper surface area of $380 \pm 23 mm^2$ (Teva Women's Health, 2014). The mechanism of contraception action is disruption of sperm transport, fertilization, and prevention of implantation through the continuous release of copper ions into the uterine cavity (Teva Women's Health, 2014). The Copper T 380A is the one LARC method that may also be used as emergency contraception within five days of unprotected sexual intercourse (Teva Women's Health, 2014).

LNG-IUSs. Currently there are four types of LNG-IUSs on the market: Mirena, Skyla, Liletta, and the most recent, Kyleena, approved in October 2016 (Bayer, 2016a; Bayer, 2016b; Bayer, 2016c; Odyssea Pharma, 2016). The mechanism of contraception action of each is similar whereby the IUS releases a slowly diminishing rate of levonorgestril over the approved period of use and this prevents pregnancy through a several mechanisms: thickening the cervical

mucus to prevent passage of sperm into the uterus, inhibition of sperm capacitation or survival, and alteration of the endometrium to prevent implantation. The variation in each of the LNG-IUSs available comes from the and FDA approved duration of use, size of the device, the initial volume of LNG contained in the device, and the *in vivo* amount of levonorgestril released over time. Each of these methods may be removed at any point after insertion but must be removed by the end of their approved duration of use time frame. The LNG-IUSs also provide non-contraceptive benefits for some women by reducing painful or heavy menstrual cycles and many women report either stark reduction in menstrual flow or complete cessation of menstrual cycles while the device is in place (Rodriguez & Darney, 2010). Therefore, unlike the Copper T 380A, the LNG-IUS devices offer secondary benefits beyond contraception.

Mirena. Mirena was the first, of the LNG-IUSs approved for use in the U.S. Like many of the others, Bayer HealthCare Pharmaceuticals Inc. manufactures it, and it's basic T-shaped design with the vertical stem acting as a drug reservoir served as the prototype for the various LNG-IUSs that followed (Bayer, 2016b). The polyethylene frame measures 32 mm wide and 32 mm long and the drug reservoir holds 52 mg LNG(Bayer, 2016b). The initial LNG release rate is 20 mcg/day up to day 90 and then falls to 18 mcg/day after 1 year and finally reaches 10 mcg/day after 5 years. A stable serum concentration between 150 – 200 pg/mL of LNG is maintained throughout the 5-year duration of use (Bayer, 2016b).

Skyla. Skyla has been approved for use for up to 3 years for pregnancy prevention. The frame measures 28mm wide by 30mm long and the drug reservoir contains 13.5mg of LNG (Bayer, 2016c). The approximate release rate is 14 mcg at 24 days, 10mcg/day after 60 days, and 5 mcg/day at 3 years. Bayer (2016c)estimates the average LNG *in vivo* release rate to be approximately 6 mcg/day over 3 years(Bayer, 2016c).

Liletta. Liletta has been approved for pregnancy prevention for up to 3 years (Odyssea Pharma, 2016). The frame measures 32 mm wide and 32 mm long and similar to the Mirena, the drug reservoir contains 52mg of LNG (Odyssea Pharma, 2016). The release rate of LNG starts at 18.5mcg/day and progressively declines to approximately 16.3 mcg/day at 1 year, 14.3 mcg/day at 2 years, and 12.6 mcg/day at 3 years (Odyssea Pharma, 2016).

Kyleena. Kyleena is the newest LNG-IUS to reach the market and has been approved for pregnancy prevention for up to 5 years (Bayer, 2016a). The frame measures 28 mm wide and 30 mm long and the drug reservoir contains 19.5 mg of LNG (Bayer, 2016a). The release rate of LNG starts at 17.5mcg/day after 24 days, and progressively declines to approximately 15.3 mcg/day after 60 days, to 9.8 mcg/day at 1 year, then 7.9 mcg/day at 3 years, and 7.4 mcg/day at 5 years (Bayer, 2016a). Bayer (2016a) estimates the average LNG *in vivo* rerelease rate to be 9 mcg/day over 5 years.

Etonogestrel Contraceptive Implant

The only etonogestrel contraceptive implant (ENG-Implant) on the market is Nexplanon, it is manufactured by Merck and is an improvement on the single rod system, Implanon, through the addition of a radiopaque material which allows the implant to be viewed on x-ray (Merck, 2016). The ENG-Implant is a sub dermal rod-shaped implant impregnated with 68mg etonogestrel and approved for 3 years of use (Merck, 2016). The mechanism of contraceptive action is similar to that of the LNG-IUS whereby absorption of the hormone causes suppression of ovulation, thickening of cervical mucous to prevent sperm from entering the uterus, and thinning of the endometrial lining to prevent implantation (Merck, 2016). Mean serum concentrations of etonogestrel were 1200 (± 604) pg/mL at two weeks after insertion and

decreased gradually to 202 (±55) pg/mL at 1 year, 164 (±58) pg/mL at 2 years, and 138 (±43) pg/mL at 3 years (Merck, 2016).

Historical Perspective of LARC Use in the US

The Dalkon Shield's Lasting Legacy. Encouraging providers to integrate LARC methods in their practice is made difficult by the troubled history many providers and patients associate with LARC. In the 1970's the Dalkon shield IUD made national news when use was associated with cases of both pelvic inflammatory disease (PID) leading to infertility and death by septic shock (Hubacher, 2002; Strasser, Borkowski, Couillard, Allina, & Wood, 2016). The Dalkon shield was later removed from the market and the defect that led to these complications, a multifilament string, is not used in modern LARC methods (Cheng, 2000; Strasser et al., 2016). The sustained fallout from this tragedy is visible today in the ubiquity of misconceptions among providers—the most common being that many LARC methods are inappropriate for nulliparous women or those who plan to have more children (Hubacher, 2002; Lewis, Darney, & Thiel de Bocanegra, 2013; Russo, Miller, & Gold, 2013). Despite extensive evidence documenting the safety of modern LARC methods, many providers are hesitant to recommend LARC or perform insertions for adolescents or nulliparous women (Greenberg, Makino, & Coles, 2013; Tanfer, Wierzbicki, & Payn, 2000). Additional reasons, cited in the literature, providers decline to offer LARC services, include inadequate reimbursement, lack of training, perceived low patient interest on the part of the provider, and provider concerns about procedure risk and litigation (Harper et al., 2008; Strasser et al., 2016).

Proven Safety. Substantial evidence intending to counter balance these fears, put providers and patients at ease, and validate the safety and efficacy of modern LARC devices exists. Over the past decade, many well-respected authorities have endorsed LARC methods

starting with the World Health Organization's (WHO) Department of Reproductive Health and Research. The WHO released their practice recommendations in 2004 outlining LARC methods as safe and highly effective contraception options suitable for all women (WHO, 2004). Three years later, in 2007, the ACOG endorsed LARC use in nulliparous women including adolescents (ACOG, 2007). Shortly after, in 2010, the CDC released revised medical eligibility criteria for providers advising that LARC methods have very few contraindications for use in women of all ages, as described earlier (CDC, 2010). In 2012, the ACOG released a grounding breaking committee opinion endorsing LARC methods as first-line contraception for all women, meeting the CDC medical eligibility criteria, including adolescents (ACOG, 2012) (Appendix A). Finally, in 2014, the AAP released a committee opinion encouraging pediatricians to educate patients about LARC methods and either acquire the skills to perform insertions themselves or be knowledgeable of providers available for referral (Ott & Sucato, 2014).

"Women don't want LARC". As discussed earlier, LARC use in the U.S. is exceedingly low as compared to European and Asian counterparts, where rates are 17.1% and 27% respectively (Buhling, Zite, Lotke, & Black, 2014). Anecdotally this is explained by American women's discomfort with these methods (L. A. Joel, personal communication, November 20, 2015). However, multiple studies have shown that American women embrace LARC use under certain, easily reproducible, conditions. The CHOICE Project, a prospective cohort study of 10,000 women aged 14-45 desiring to avoid pregnancy for greater than a year, provided standardized contraception counseling and free contraception to participants (Secura, Allsworth, Madden, Mullersman, & Peipert, 2010). They found when LARC was discussed as first-line contraception with every woman, every time and cost was eliminated, 67% of participants chose LARC methods (95% CI, 65.3-69.0) (Secura et al., 2010). A study comparing

rates of LARC use between a convenience sample of 488 female family planning providers aged 25-44, including physicians and advance practice clinicians, and female respondents of the same age from the 2011-2013 National Survey of Family Growth (NSFG) showed LARC use varied widely between the NSFG respondents and the providers, 12.1% and 41.7% respectively (Stern et al., 2015). While beyond the scope of the study to definitively explain this difference, the authors attributed the variance to knowledge of LARC methods and access (Stern et al., 2015).

Modern Barriers to Access

As discussed previously, PCPs saw 11.5 million visits in 2010 for family planning and contraception acquisition (Pickle et al., 2014). This number is only expected to increase with the implementation of the Affordable Care Act, which includes a provision requiring full coverage for contraception counseling and services at no cost to the patient (Pickle et al., 2014; U.S. Department of Health and Human Services, 2014). However, changes to this provision may be coming given the political flux around insurance coverage requirements and healthcare laws in the country. Regardless of the political direction, ideally, primary care providers are prepared to offer these women the same options for family planning they would receive from an obstetrician-gynecologist (OB-GYN) or women's health NP (WHNP) but too often, this is not the case (Cheng, 2000; Harper et al., 2013; Vaaler et al., 2012). If the same holds true among NC NPs providing contraception services in primary care clinics, then these practitioners are a prime target for future practice improvement interventions such as LARC training programs to improve access.

Providers Lack Training. The small percentage of providers trained in LARC methods is cited countless times in the literature as a barrier to LARC access (Greenberg et al., 2013; Harper et al., 2013; Nobiling & Drolet, 2012; Potter, Koyama, & Coles, 2015). Three major

studies have released data specific to the disparities on LARC education and provision between primary care providers and specialists. The first, a study of 816 physicians, NPs, and PAs working in the California Family Planning Program (CFPP) for low-income women found that among participants only 4% of OB-GYNs were untrained in LARC methods while rates for other physician specialties, and the advance practice clinicians, were substantially higher at 32% and 41% respectively (Harper et al., 2008). In the second study, a survey exclusively examining LARC training among 586 NPs, who routinely provide contraceptive care, 66% of WHNPs reported IUD training compared to 12% of primary care NPs (Harper et al., 2013). The trend continued for contraceptive implants with 42% of WHNPs trained in Nexplanon compared to 10% of family practice NPs (Harper et al., 2013). The final study of 249 physicians and advanced practice clinicians working in California's Family Planning, Access, Care, and Treatment (Family PACT) program, examined the impact of a provider training session on participant knowledge and provision of LARCs found that 61% of participants received no training in LARC methods during their residency/core training (Lewis et al., 2013). These numbers make it very clear that there is room for improvement among primary care providers who provide contraception services, the exact population this project aims to survey. Furthermore, as discussed earlier, there are proven differences between urban and rural providers, in multiple states, as to training, comfort, and knowledge of LARC methods (Lunde et al., 2014; Vaaler et al., 2012).

Misconceptions Influencing Clinical Practice

Further research has identified pervasive misconceptions many providers have regarding LARC methods, which have an effect the contraceptive counseling providers give patients and therefore ultimately affect LARC access. In semi-structured interviews with 42 women,

participants indicated while the final decision making power over contraception choice was theirs, comprehensive counseling on all methods and a shared decision making process with their providers weighed heavily on their final choice (Dehlendorf, Levy, Kelley, Grumbach, & Steinauer, 2013). When providers harbor these misconceptions, it affects the quality contraception counseling provided to patients and creates missed opportunities for LARC discussion with patients (Dehlendorf et al., 2013). Furthermore, the CHOICE project discussed earlier demonstrates the power of standardized contraception counseling highlighting LARC methods as first line on patient's choices of contraception (Secura et al., 2010).

Patient Selection. Pervasive misconceptions surround criteria for appropriate patient selection; this is particularly concerning in light of the WHO, CDC, ACOG, and AAP recommendations (ACOG, 2007; ACOG, 2009; CDC, 2010; Ott & Sucato, 2014; WHO, 2004). A study of 635 office based providers and 1,324 Title X clinic providers (physicians, PAs, certified nurse midwifes, NPs, and nurses) showed 30% of percent of respondents had misconceptions about the safety of IUDs in nulliparous women (Tyler et al., 2012). The CFPP survey showed providers had erroneous knowledge in appropriate patient selection based on comorbidities, 24% reported IUDs are inappropriate in women with diabetes, 66% reported they would not insert a levonorgestril-releasing IUD in a smoker, though neither of these are contraindications for use in either population (Harper et al., 2008). Another survey of 137 providers, physician and advance practice clinicians, in Saint Louis showed 29% incorrectly believed IUD methods increased the risk of PID (Madden, Allsworth, Hladky, Secura, & Peipert, 2010). Increased provider knowledge of and positive attitudes toward LARC is correlated with increased comfort in recommending these methods (Postlethwaite, Shaber, Mancuso, Flores, & Armstrong, 2007).

Progress Through Training Programs

A proven way to address provider misconceptions, increase provider knowledge and comfort with LARC methods, and teach insertion techniques is through attendance at training sessions. Multiple independent studies have proven the effectiveness of training programs in addressing the three key ways providers act as barriers to access: 1) lack trained providers, 2) use of overly stringent patient selection criteria, 3) failure discuss LARC options with patients (Branum & Jones, 2015; Lewis et al., 2013; Postlethwaite et al., 2007; Rubin, 2013). The Family PACT study, described earlier, found statistical significance after training in provider understanding of appropriate candidate selection ($p<0.001$), provision of IUDs in the 6 months after training compared to the 6 months prior ($p<0.01$), and participating sites saw an increase in IUD use compared to their nonparticipating comparison sites ($p<0.01$) (Lewis et al., 2013). A recent randomized trial of 40 reproductive health clinics across the U.S., which served 1,500 women during the study, showed that the intervention, an evidence-based training program in LARC insertion and contraception counseling was effective in changing clinical practice and impacting LARC provision as compared to the standard of care sites which received no training (Harper et al., 2015). The intervention proved to be successful in initiating practice change; women seen at the interventional sites reported receiving counseling on LARC methods at higher rates, 71% vs. 39% (odds ratio 3.8, 95% CI 2.8-5.2), and more opted for LARC methods, 28% vs. 17% (odds ratio 1.9; 95% CI 1.3-2.8) (Harper et al., 2015). The pregnancy rate 12 months out was lower at interventional clinics than standard of care clinics and the authors attribute this to the increase in LARC counseling and provision at the interventional clinics (Harper et al., 2015).

As training programs, such as the "Beyond the Pill" program developed by Harper et al. (2015), are shown to be effective in the literature, the widespread diffusion and sweeping implementation of these programs is key to initiating practice change for providers. However, these programs have only been studied in the context of participants recruited as part of larger research projects. In order to market these programs and recruit participants outside of research studies, an initial step is first determining the current CCP and educational needs of providers in the area.

Conceptual and Theoretical Framework

Introduction to Diffusion of Innovation

The Diffusion of Innovation Theory (DOI), is a social science theory, which aims to explain how, over time, an idea, product, or technology gains momentum and spreads through a specific population finally resulting either in widespread adoption or failure (Rogers, 2003). The theory postulates three basic clusters of influence affect the rate and spread of change (Berwick, 2003; Rogers, 2003). These are, perceptions of the innovation, characteristics of the people who adopt or fail to adopt the innovation, and contextual factors such as location, leadership, and management (Berwick, 2003; Rogers, 2003). Interventional strategies for the theory include the creation of a change agent, who works to spread information and knowledge to others within their sphere of influence and supplying resources to help addressing contextual factors impeding adoption (Berwick, 2003; Dearing, 2009; Rogers, 2003). In healthcare, DOI has been used to explain the adoption or failure of clinical behavior change including the introduction of new treatment techniques, new medications, and new guidelines. It is being used here to understand trends in CCP and the level to which practice change has been incorporated in light of the recent changes to contraception guidelines discussed earlier.

Application. Among providers, the adoption of LARC methods, through participation in post-graduate training, in family practice has been slow as shown by the shortage of providers in primary care trained in insertion techniques (Harper et al., 2015; Lewis et al., 2013). The majority of PCPs do not receive training in LARC method insertion during their graduate programs and therefore must seek out learning opportunities once they have started practicing (Lewis et al., 2013). This theory offers an explanation of the observed trajectory of adoption, and also discusses concepts that need to be addressed in interventions that aim to change that trajectory (Dearing, 2009; Fink, Thompson, & Bonnes, 2005; Moulding, Silagy, & Weller, 1999).

LARC & The DOI. It is important to acknowledge LARC methods as the innovation in question. If the innovation itself is unacceptable to providers, diffusion will fail. There are five elements of an innovation that determine if adoption will occur: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003; Sanson-Fisher, 2004).

Relative advantage. Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes (Rogers, 2003; Sanson-Fisher, 2004). There is ample proof the literature that LARC methods are more effective than their short acting reversible counterparts (CDC, 2014; Harper et al., 2013).

Compatibility. Compatibility describes the extent to which potential adopters' perceptions of the innovation match their existing values, experiences, and needs (Rogers, 2003; Sanson-Fisher, 2004). In the literature, providers often express the desire for additional training in LARC methods, indicating an underlying acceptance of the innovation as compatible with their needs (Harper et al., 2015).

Complexity. Complexity measures perceptions of difficulty associated with the innovation (Rogers, 2003; Sanson-Fisher, 2004). While providers express a desire for training, incorporating this into clinical practice proves more complex, as it requires behavior change in all staffing levels. The proven success of many clinics in incorporating LARC methods in practice indicates this is a surmountable obstacle (Harper et al., 2015; Jeffreys & Clark, 2012; Secura et al., 2010).

Trialability. Trialability describes the degree to which an intervention can be trialed and modified in practice (Rogers, 2003; Sanson-Fisher, 2004). There is very little individual trialability to LARC methods, since training is binary; providers have either received training or they have not. However, providers are not mandated to insert LARC methods themselves just because they possess the skills to do so since there is also the concept of competency to consider, as providers who receive training are not immediately competent in insertion techniques. This is particularly true of the IUDs, as insertion requires a far more nuanced technique and skill than that of the LNG-Implant. Therefore, trialability exists in the sense that after training, providers may offer and insert LARC methods for a period of time before deciding that it is not feasible in their individual practice model. There also exists trialability in the way that providers who are not trained in insertion techniques may simply change their CCP to reflect inclusion of LARCs and later referring patients to providers who do perform insertions.

Observability. Observability describes the degree to which results of the innovation are visible (Rogers, 2003; Sanson-Fisher, 2004). The potential to reduce rates of unintended pregnancy with LARC methods were initially theoretical, but recent publications have shown demonstrable rate reductions (Harper et al., 2015; Speidel, Harper, & Shields, 2008).

When looking at the balance of these five elements, it is clear that as an innovation, LARC methods pass the litmus test of acceptability for providers. This is further supported by the slow but continuous rise in use among American women, indicating that they too find it acceptable as an innovation (Branum & Jones, 2015).

The diffusion of innovation theory states that for early efforts to gain traction, they must have significant investment of resources or heavily dedicated early adopters (Rogers, 2003; Sanson-Fisher, 2004). It is unknown if diffusion of LARC methods among clinicians in North Carolina had either of these or a combination of the two to drive diffusion forward. However, 7 years have passed since the CDC first changed their MEC to reflect the safety of LARC use in women of all ages, and 5 years have passed since the ACOG endorsed use of LARC methods as first line contraception for all women, and this project will help to determine how readily these recommendations have been embraced by practitioners and if practice change has diffused out among primary care providers in the state such that their contraceptive clinical practice might match that of their peers in women's health. However, this is not reflected in the available literature and therefore it is hypothesized that rapid diffusion has not yet occurred. It is expected that the CCP pattern of providers will vary according to their graduate practice program and providers who trained in graduate programs specific to women's health (WHNP/OGNP or CNM) will demonstrate a CCP pattern that most closely adheres to current guideline recommendations for LARC use.

CHAPTER 3

METHODOLOGY

A modified the National Pregnancy and HIV/STI Prevention Survey (Harper et al., 2013) was distributed to the advanced practice nurses on the list-serve of North Carolina Board of Nursing between November 14th, 2016 and January 9th, 2017. The University of North Carolina, Chapel Hill Institutional Review Board and Office Human Research Ethics approved the study. The results were analyzed in collaboration with (Yeun, Marron) and assistance from the Howard W. Odum Institute for Research in Social Science (ODUM).

Subjects

Participants were advanced practice registered nurses, identified through a data request made to The North Carolina Board of Nursing (NCBON) for the list of all licensed advance practice registered nurses in the state (NCBON, 2016). The list is publically available for a nominal fee and released by the NCBON for the specific purpose listed in the application. Data provided includes practitioner name, address, county, email address (where available), primary specialty, secondary specialty, and practice setting (NCBON, 2016). The database is updated in real time and contains all NPs in the state who are active and in good standing at the time of the request (personal communication, L. Fogel, February 11, 2016). Data provided was up-to-date as of October 10th, 2016.

Of the 6,622 NP names provided as part of the original data set, 41 did not have associated email addresses and of the 308 CNM names provided, 7 did not have associated email addresses. Therefore, the original mailing was sent to a total recipient list of 6,859 unique email

Process

First, an email introducing the study with a link to the survey was sent to the list-serve. Participation was incentivized with entry to a drawing for a gift card, with varying amounts, upon survey completion with multiple winners (4) drawn from the participant pool. At weeks 3, 5, and 7 a reminder email was sent to the same list-serve which had been modified to remove emails of those who had already participated, as reflected by entering the drawing, or had opted out of participation through the opt-out link provided. The survey remained open for a total of 8 weeks with total data collection taking place between November 14th, 2016 and January 9th, 2017.

Data Collection. Survey data was collected and stored using Qualtrics Research Suite, an online survey tool available to students at The University of North Carolina- Chapel Hill. Qualtrics allows for anonymous survey participation, easy data downloads to multiple formats for analysis, and has been approved by the UNC IRB for research activities.

Study Survey. A 40-item questionnaire tool was adapted from the "National Pregnancy and HIV/STI Prevention Survey" with permission from Dr. Cynthia Harper at The University of Southern California-San Francisco (Harper et al., 2013) (Appendix B). The original 65 survey questions were developed through 31 formative, qualitative interviews with clinicians including physicians, nurse practitioners, and physician assistants (Harper et al., 2013; Henderson, Sawaya, Blum, Stratton, & Harper, 2010). Question adaptation was performed with guidance from ODUM faculty. Questions were modified to update current market availability of LARC methods, clarify questions to reflect differences between IUDs and Implants, and clarify the types of visits in which provision of contraceptive counseling practice was being asked. Additional demographic questions were added to allow further investigation into differences

between rural and urban areas of the state. The original survey underwent reliability—Cronbach's alpha, with reliability coefficients of between 0.77 and 0.88, was used during scale creation—and validity tests as part of its initial development (Harper et al., 2008). The final survey has skip logic applied with the shortest logic path ending after a single question and the longest after 40 questions. Of the 40 questions, 10 are demographic questions inquiring about the provider's age, educational background, practice setting, and patient population. Twenty-eight questions focus on CCP and LARCs. These questions evaluate provider prescriptive behavior, perception of patient interest in LARCs, contraception methods currently discussed when counseling patients, and provider decision making in discussing and recommending LARC methods to patients. One question assesses the participant's current interest in receiving LARC training and one question allows participants to offer additional comments they may have relevant to the survey.

Approach to Analysis

To test the hypothesis that the CCP pattern of providers would vary according to their graduate practice program preparation, the primary predictor variable was educational background and professional training received by participants (Family Nurse Practitioner, Women's Health Nurse Practitioner/Obstetrics & Gynecology Nurse Practitioner, Adult/Geriatric Nurse Practitioner, Pediatric Nurse Practitioner, or Certified Nurse Midwife). Average visit times allocated to contraceptive counseling were calculated from free text answers. Measurement of clinician knowledge was evaluated against the indications for LARC use as determined by the CDC's Medical Eligibility Criteria for Contraceptive Use (CDC, 2010) (Appendix A). Adherence to the CDC's MEC in answering these questions indicated a higher level of understanding of and practicing to current evidence-based guidelines.

Statistical Analysis. Statistical analysis was performed with assistance from Chuchu Yuan and Steve Marron, PhD in the Department of Statistics and Operations Research at The University of North Carolina- Chapel Hill. Statistics performed included bivariate analysis using ordinal and logistic regressions. Heather Ba at the Odom Institute at The University of North Carolina- Chapel Hill provided additional assistance.

Data was initially downloaded from Qualtrics in a .CSV file, converted to excel, and then uploaded to Stata for early data analysis including frequencies and odds ratios for one question. Early data analysis was performed with assistance from Heather Ba at ODUM. Data was then brought to Chuchu Yuan and Dr. Steve Marron for counseling to develop a final analysis plan for the two hypotheses. During a meeting including Dr. SeonAe Yeo, Chuchu Yuan, Dr. Steve Marron, and myself a detailed plan was outlined as to how the statistical analysis would be run and the survey question data needed. The raw data was then cleaned to create a new file including only the questions required for analysis and only those responses from eligible participants. Statistical analysis was then performed by Chuchu Yuan and returned, via email, with odds ratios and p values for each point outlined at the initial meeting.

CHAPTER 4

RESULTS

A total of 1,315 APRNs replied to the survey. Of those, 996 were judged initially eligible by an affirmative answer to the question of whether they had one or more occasions to provide contraceptive counseling to their patients in the past 12 months at their current position and by answering their graduate practice program preparation.

Demographics

Provider Demographics. A total of 810 responses served for the analyses. Final data was prepared from responses provided by 472 FNPs, 69 WHNP/OGNPs, 68 AGNPs, 49 PNPs, and 115 CNMs. There were 37 respondents who held dual degrees (10 FNP, WHNP; 8 FNP, AGNP; 2 FNP, PNP; 7 FNP, CNM; 2 WHNP, AGNP; 7 WHNP, CNM; 1 AGNP, PNP).

Overwhelmingly, across all provider types, the respondents were female (Table 1). Those trained in women's health, WHNP/OGNP and CNM, accounted for 25.6% of respondents. Providers surveyed worked across all areas of the state with similar representation of urban (38.3%), regional/suburban cities (29.4%), and rural (29.7%) areas (Table 1). Of the 100 counties in North Carolina only 12 were not represented by at least one respondent in this study. These 12 counties are all considered rural areas and include: Allegany, Anson, Camden, Cherokee, Chowan, Clay, McDowell, Pamlico, Perquimans, Polk, Transylvania, and Washington Counties.

Provider Practice Background. On average practitioners with graduate preparation specific to women's health (WHNP/OGNP and CNM) saw nearly three times as many patients requiring contraception counseling per week, 27.3 ± 14.8 (mean [M] ± standard deviation [SD]), and 19 ± 21 respectively, compared to the FNPs who saw 9.5 ± 14.4 and the AGNPs who saw 4.7 ± 8.9, and more than ten times as many as the PNPs surveyed at 2.8 ± 3.6 (Figure 1). Overall, providers reported having similar quantities of time available to provide contraceptive counseling during a patient visit, on average, with FNPs reporting 9 ± 6 minutes (mean [M] ± standard deviation [SD]), WHNPs reporting 10 ± 5 minutes, AGNPs reporting 8 ± 8 minutes, PNPs reporting 8 ± 6 minutes, and CNMs reporting 10 ± 5 minutes (Figure 2).

In general, AGNPs excluded as they reported satisfaction at less then 50%, providers reported that they felt they had enough time to counsel their patients on the contraceptive options available to them, but those in primary care did so at lower frequencies than their women's health peers (Figure 2). Specifically, among women's health providers, WHNPs and CNMs, satisfaction rates were as high as 82.6% and 73.0%, respectively (Figure 2). Conversely, primary care providers reported lower rates as follows: FNP 68%, AGNP 50.7%, and PNP 55.1% (Figure 2).

Participants were asked to indicate if their clinics had anyone else, without prescriptive authority (i.e. registered nurses, licensed practical nurses, social workers, or peer counselors), available to counsel patients on their contraceptive options. Primary care providers reported working in settings without additional assistance to provide contraceptive counseling to patients at double the rate of their peers in women's health, FNP 55.4%, AGNP 55.1%, and PNP 63.3% versus 18.8% WHNP and 37.4% CNM (Figure 3). Overwhelmingly, all providers felt that

LARC methods were safe and that their patients were receptive to learning about LARC methods, both IUDs and Implants (Figure 4; Figure 5).

Variation of CCP Pattern by Graduate Practice Preparation

It was hypothesized that the CCP pattern of providers would vary according to their graduate practice program preparation and providers who trained in graduate programs specific to women's health (WHNP/OGNP or CNM) would demonstrate a CCP pattern that most closely adheres to current guideline recommendations for LARC use. Responses from those providers trained in graduate programs specific to women's health (WHNP/OGNP and CNM) were used as the standard to which all other provider's responses were compared.

Discussion of vs. In Office Availability of Contraceptive Methods. Women's health providers discussed all contraceptive methods at consistently high frequencies, as was the availability of these same methods (Figure 6). Conversely, among primary care providers we saw far more variation in both the discussion of contraceptive methods as well as the in-office availability of many methods (Figure 6). Of specific interest, LARC methods were discussed by women's health providers at nearly perfect numbers with 100% of WHNPs and 99.1% of CNMs reporting discussing the ENG-Implant, 97.1% of WHNPs and 97.4% of CNMs reporting disusing the Cu-IUD, and 100% of both WHNPs and CNMs reporting discussing the LNG-IUD with their patients (Figure 6). Frequencies were lower among primary care providers for discussion of LARC methods. For the ENG-Implant, 80.1% of FNPs, 52.1% of AGNPs, and 89.8% of PNPs reported discussing this method with patients (Figure 6). Similarly low numbers were seen for discussion of IUC methods among primary care providers. The Cu-IUD was discussed by 68.9% of FNPs, 46.4% of AGNPs, and 18.4% of PNPs (Figure 6).

In-office availability of methods discussed during contraceptive counseling, specifically among the LARC methods, were found to be vastly different between women's health providers as compared to primary care providers (Figure 6). Women's health providers were again found to have LARC methods available to patients at consistently high frequencies. The ENG-Implant was available in-office with 88.4% of WHNPs and 100% of CNMs. Similarly, high frequencies were seen for the IUC methods with 92.7% and 95.6% of WHNPs reporting having the Cu-IUD and LNG-IUD available respectively. Rates for CNMs were similar at 94.7% and 100% for the Cu-IUD and LNG-IUD respectively. Comparatively, rates for in-office availability were much lower among primary care providers with only 38.1% of FNPs, 17.4% of AGNPs, and 28.6% of PNPs having the ENG-Implant available in-office. Even lower rates of in-office availability were seen for the IUC methods with 30.3% and 35.4% of FNPs reporting availability for the Cu-IUD and LNG-IUD respectively. Among AGNPs 7.2% reported having the Cu-IUD available in office and 14.9% reported the same for the LNG-IUD. The lowest rates of in-office availability were seen for the CU-IUD and LNG-IUD among PNPs with at only 2% for both methods.

Routine Discussion of LARC Methods

Further evaluation of contraceptive method discussion was done to determine if LARC methods were being routinely discussed with patients during contraceptive counseling. Therefore providers were asked to report the frequency with which they discussed individual LARC methods. Routine discussion was defined as responses indicating providers discussed these methods with either "more than half, but not all" or "all" of their female patients to whom they had provided contraceptive counseling. Odds ratios were calculated to determine the relative likelihood of LARC discussion during contraception counseling by provider type (Figure 7). Results were statistically significant ($p=0.00$) with women's health providers four times

more likely to routinely discuss the ENG-Implant and 9.5 times more likely to routinely discuss the IUC methods with patients during contraceptive counseling than their peers in primary care.

Consideration of LARC Methods

Respondents were asked about their decision-making during contraceptive counseling as part of a well-woman exam (annual physical) or non-acute follow-up visit when recommending an IUD for patients with a variety of lifestyle choices or medical comorbidities. During analysis, combining responses "no" and "don't know" as one category dichotomized responses. During analysis, provider types were grouped as primary care, FNP, AGNP, and PNP, and women's health, WHNP and CNM (Figure 8).

Again, vast differences were seen in the responses given by women's health providers and those of the primary care providers. Significant differences ($p = <.0001$) were seen in the recommendation for an IUD to a nulliparous woman were Women's health providers 7 times more likely to do so than were primary care providers. Adolescent women seeking an IUD are 9 times more likely to be recommended one if they see a women's health provider than if they were to have seen a primary care provider, again, a significant result ($p = <.0001$).

Of particular interest were the results as to reccomndations for unmarried, cohabitating versus unmarried, not cohabitating women. Essentially, these two populations are the same and providers were not given any other information as to their sexual history or number of partners when answering the question. However, unmarried, cohabitating women were 30 times more likely to receive a recommendation for an IUD from a women's health provider than a primary care provider and unmarried, not cohabitating women were 10 times more likely to receive the same. Data was statistically significant ($p = <.0001$) for both conditions.

Finally, providers were presented with women with more complex gynecologic histories including those who had a history of a sexually transmitted infection (STI) within the past two years, a history of pelvic inflammatory disease (PID), and a history of an ectopic pregnancy. Again, statically significant differences (p= <.0001) were seen in the likelihood of recommending an IUD to these women depending on the type of provider answering the questions. Women's health providers were 7 times more likely to recommend an IUD to a woman with a history of STI, 3 times more likely for a woman with a history of PID, and 5 times more likely to do so for a woman who had previously experienced an ectopic pregnancy than their peers in primary care.

Provider Concerns Affecting IUD Recommendation

Providers must weigh a variety of concerns when they consider recommending an IUD during contraceptive counseling. To assess the relative impact of these concerns we asked participants to consider a selected set of patient conditions and reflect on their relative level of concern for each when considering recommending an IUD. For data analysis, responses indicating a moderate or high level of concern might indicate a provider are unlikely to recommend an IUD to a patient with the condition in question.

Primary care providers reported higher levels of concern for all conditions as compared to their peers in Women's Health (Figure 9). Adolescence weighed most heavily on the minds of primary care providers as women's health providers were 3.7 times more likely to report low level of concern in recommending an IUD to a teenager than primary care providers were, a statistically significant result (p= <.0001). Uterine perforation at insertion was the next most concerning condition for primary care providers where women's health providers were 2.8 times more likely to report a low level of concern (p= <.0001). Consistent with the data seen earlier as

to recommendation for patients with a history of STI or PID, we see that these concerns weigh less heavily on the minds of women's health providers than they do for primary care providers where women's health providers are 2 and 1.9 times more likely to report low levels of concern for these conditions respectively (p= <.0001). Finally, women's health providers were 1.7 and 2.3 times more likely to report low levels of concern regarding expulsion (p= 0.0113) and infertility (p= 0.0010), respectively, than were primary care providers.

Assessment of MEC Understanding

A strong understanding of the CDC MEC is essential in order for providers to properly counsel their patients on all contraceptive options available to them. Providers were asked a question to assess their understanding of the MEC by asking if they would consider recommending a Cu-IUD when certain co-morbidities were present. During analysis, combining responses "no" and "don't know" as one category dichotomized responses. Again, provider types were grouped as primary care, FNP, AGNP, and PNP, and women's health, WHNP and CNM.

Data for this section revealed stark differences between women's health providers and primary care providers as to knowledge of appropriate candidate selection for the Cu-IUD as outlined in the CDC MEC (Figure 10). For women with conditions commonly seen in primary care including diabetes, obesity, smoking, and hypertension primary care providers were consistently, significantly less likely to recommend the Cu-IUD than their peers in women's health (Figure 11). Women's health providers were 11 and 12 times more likely to recommend an Cu-IUD to women with diabetes and obesity respectively than were primary care providers, a significant result (p= <.0001). Furthermore, additional significant results were seen for women identifying as smokers or as having a history of hypertension, women's health providers were

155 and 152 times more likely to recommend a Cu-IUD, respectively, as compared to their peers in primary care (p= 0.0004).

Women's health providers were only less likely to recommend a Cu-IUD for women with three conditions including menorrhagia, dysmenorrhea, and iron deficiency anemia (the only statistically insignificant result) (Figure 12). In these cases, women's health providers had 0.4 and 0.7 times lower odds of recommending a Cu-IUD to women with menorrhagia and dysmenorrhea respectively, compared to primary care providers (p= <.0001 and p= 0.0494 respectively).

CHAPTER 5

DISCUSSION

We saw statistically significant differences among the CCP of primary care providers as compared to women's health providers across a variety of measures all of which both individually and collectively have the potential to affect the quality of contraceptive counseling and services provided.

Primary care providers not only discussed LARC methods at lower rates than their peers in women's health but in-office availability of these methods was also markedly lower. Access or lack there of to LARC methods has been shown to be a significant barrier for many women and when patients are made to see multiple providers in order to access the method they desire, they face the potential of an additional financial hardship in the form of multiple co-pays for the visits (Secura et al., 2010). Furthermore, it was found that women's health providers were significantly more likely to routinely discuss LARC methods with their patients during contraceptive counseling indicating that there is a potential practice gap between the contraceptive options counseling that would be received by the same woman if she were to visit a primary care provider for her contraceptive needs versus a women's health provider. It is possible that the different approach to discussing LARC methods may stem from the fact that primary care providers are less comfortable discussing these methods even though they report believing they are safe and believing that their patient populations underutilize them. From the literature, we know that primary care providers are trained in LARC insertion methods at greatly

reduced rates as compared to their counterparts in women's health (Greenberg et al., 2013; Harper et al., 2013). This difference in specific training may account for some of the data we see where primary care providers reported having LARC methods available in their clinics at reduced rates compared to their women's health counterparts.

While statistically significant differences were seen almost universally between the assessment of MEC understanding for the Cu-IUD between primary care providers and women's health providers, the most concerning differences were the data point as to diabetes, obesity, hypertension, and smoking. Under the CDC MEC, none of these are reasons that would preclude a woman from receiving a Cu-IUD and are very common problems addressed in primary care for which it would be expected that primary care providers should be aware of the contraception options open to these women in order to provide comprehensive counseling. Additionally, for some of these conditions, a Cu-IUD may in fact be the best choice for the woman because recent studies have found that OCPs are less effective in obese women and the increased risk of stroke is well known for women using OCPs who have hypertension or smoke (Bousser & Kittner, 2000; Simmons & Edelman, 2016).

Additional concerns come about from the differences seen as to provider recommendation of LARC methods for adolescents and unmarried women depending on their cohabitation status. For adolescents, an unplanned pregnancy can be catastrophic and have lasting impacts that span health outcomes for multiple generations (Guttmacher Institute, 2015; Ng & Kaye, 2012). By providing them with highly effective contraception that has ben endorsed as the first-line recommendation by the APA, and therefore reducing their risk of an unintended pregnancy, healthcare providers perform a service which has been proven to increase their likelihood of finishing high school but also increasing their earning potential for the rest of their

life (Ng & Kaye, 2012). As to the differences in provider recommendations that we saw for unmarried cohabitating women versus unmarried women who are not living with their partner, there is nothing about these two groups of women, from the information presented to providers, that would make one a better candidate for a IUD than the other. It appears that there may be value judgments on the part of the provider that are coming through in their contraceptive counseling reccomndations. These judgments may be entirely unconscious or they may stem from the misplaced belief that an unmarried woman who is not cohabitating may have more sexual partners than the woman who reports living with a partner and therefore by recommending an IUD, the provider would be putting one woman at increased risk for STIs. The intrusion of provider bias in contraceptive counseling has the potential to further reduce women's access to LARC methods and may adversely affect women's relationship with their provider if they feel judged by a provider's actions (Dehlendorf et al., 2014).

Future Directions

From the data collected here, it is clear that continued work to improve LARC access in the primary setting. Such work includes educating primary care providers as to LARC methods insertion, appropriate patient selection, and working to reduce the exaggerated concerns as to patient co-morbidities on the part of the provider that reduce their likelihood of recommending LARC methods. The best way to do this may be through the use of provider training programs as they have been proven to be successful in bringing about demonstrable practice changes in providers who have attended (Harper et al., 2015). Comments left by participants indicated that there would be more than adequate attendance at such a program to interest one of the better-known programs such as "Beyond the Pill" to organize such a training program here.

Project Limitations

One major limitation of the study is its nature as a convenience sample. While this choice was made for logical reasons, it limits the ability of the data to be used to draw conclusions as to NP CCP trends on the whole. Additional problems may lie in having asked providers to report about their own practice. Social desirability bias may have some effect on the data collected, as providers would be likely to report behaviors they felt would reflect best on their knowledge base and practice trends. However, if this were to be true, it may make differences in CCP more pronounced across the data analysis, which, in the end, may match more closely to the actual CCP of providers who fell susceptible to reporting their CCP to match what they believed would be socially desirable.

Furthermore, the survey weighed heavily in its evaluation of provider's decisions in recommending IUD methods based on the CDC MEC. While questions were asked about the ENG-Implant training and provision, questions did not follow the same rigor as placed on those evaluating provider knowledge and decision making in regards to the IUD. In retrospect, it would have been very valuable to evaluate provider decision making in the same way as the ENG-Implant may be a LARC method that is easier to receive training in, master, and subsequently incorporate into practice in the primary care setting than the IUD. Decisions to limit question number were made based on the length of the overall survey and the resulting time burden placed on participants and weighed against worries of increased dropout rates among participants, which might skew the data collected. Going forward, it would be worthwhile to study provider behaviors specific to the LNG-Implant as it is becoming more and more clear that this is the LARC method that might prove easiest for providers to be trained on and subsequently provide as an in-office option for long-term contraception in the primary care setting.

Conclusions

From the data collected, it is clear that we are still in the early stages of adoption of LARC methods in the primary care setting. Despite having been released more than 7 years ago, it is clear that providers have not fully embraced and incorporated the first-line contraception recommendation changes endorsed by the CDC, ACOG, and AAP. While some paradigm shifts in healthcare occur rapidly, it is clear that this one had a slower trajectory toward full incorporation. Despite that, we remain encouraged by the changes we have seen and the interest expressed by participants in learning more about LARC methods.

Table 1. Provider Demographics

	Women's Health		Primary Care		
	WHNP	**CNM**	**FNP**	**AGNP**	**PNP**
Clinician Demographics					
Age, mean years (SD)	49 (11.9)	47 (11.4)	43 (11.3)	43 (11.0)	42 (13.1)
Gender, n (%)					
Male	0 (0)	1 (0.8)	18 (3.6)	1 (1.3)	0 (0)
Female	88 (100)	128 (99.2)	477 (96)	78 (98.7)	52 (100)
Other, specify	0 (0)	0 (0)	2 (0.4)	0 (0)	0 (0)
Race/Ethnicity, n (%)					
White	77 (89.5)	116 (86.6)	420 (83.3)	64 (80)	49 (94.2)
Black or African American	7 (8.1)	13 (9.7)	48 (9.6)	8 (10)	0 (0)
Am. Indian or Alaska Native	0 (0)	3 (2.2)	11 (2.2)	2 (2.5)	1 (1.9)
Asian	0 (0)	1 (0.7)	13 (2.6)	3 (3.8)	0 (0)
Native Hawaiian or Pacific Islander	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hispanic/Latino	1 (1.6)	2 (1.5)	12 (2.4)	1 (1.3)	0 (0)
Other, specify	2 (2.3)	1 (0.7)	9 (1.8)	3 (3.8)	2 (3.8)
Practice Location					
Rural vs. Urban					
Rural[1]	24 (30)	28 (23.3)	156 (33.1)	15 (21.1)	12 (24)
City/Suburban Area[2]	23 (28.8)	38 (31.6)	137 (29.1)	24 (33.8)	11 (22)
Urban[3]	32 (40)	52 (43.3)	163 (34.6)	30 (42.8)	26 (52)

Abbreviations:

WHNP = Women's Health Nurse Practitioner
CNM = Certified Nurse Midwife
FNP = Family Nurse Practitioner
AGNP = Adult / Geriatric Nurse Practitioner
PNP = Adult / Geriatric Nurse Practitioner
SD = Standard Deviation
1 = < 250 people/square mile
2 = 251-750 people/square mile
3 = > 751 people/square mile

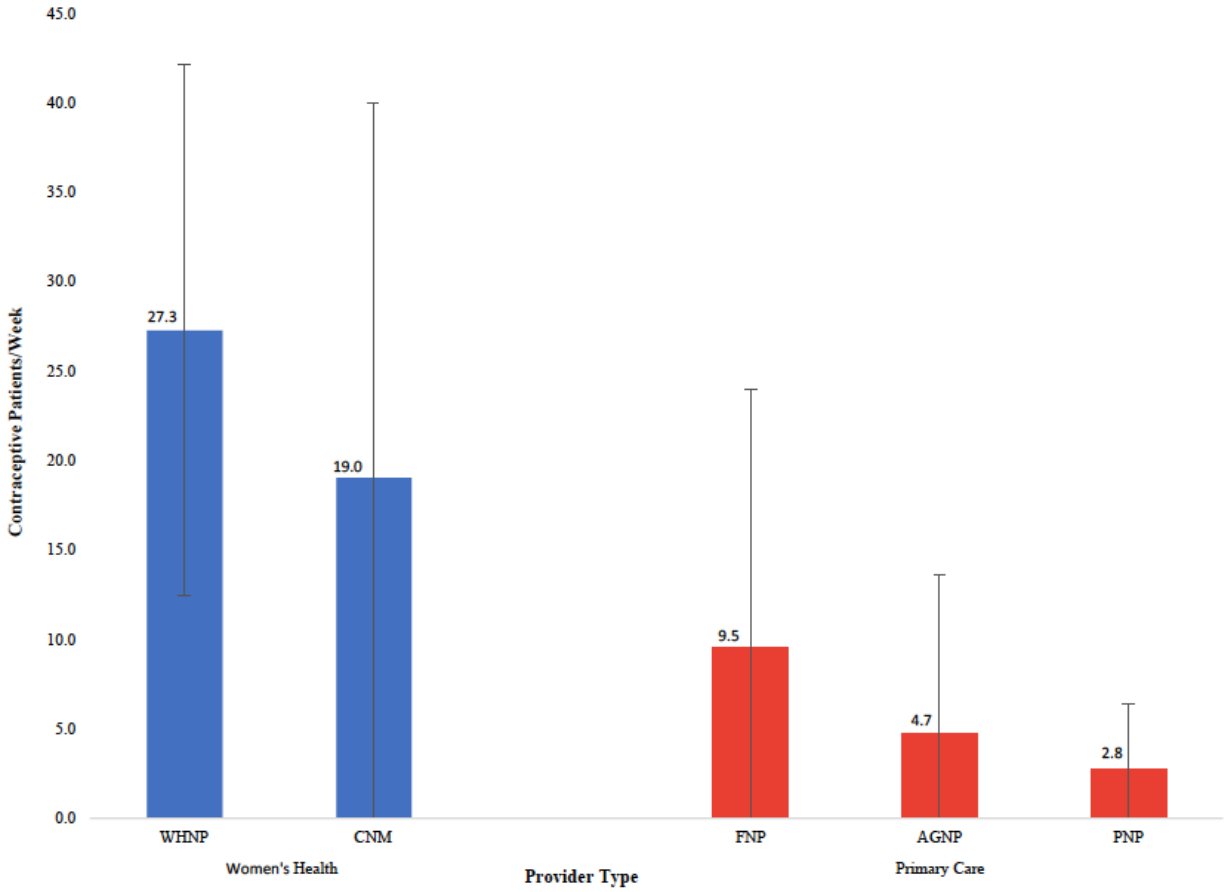

Figure 1. Average number of patients seen per week requiring contraceptive counseling and services by provider type. Standard deviations are presented as error bars.

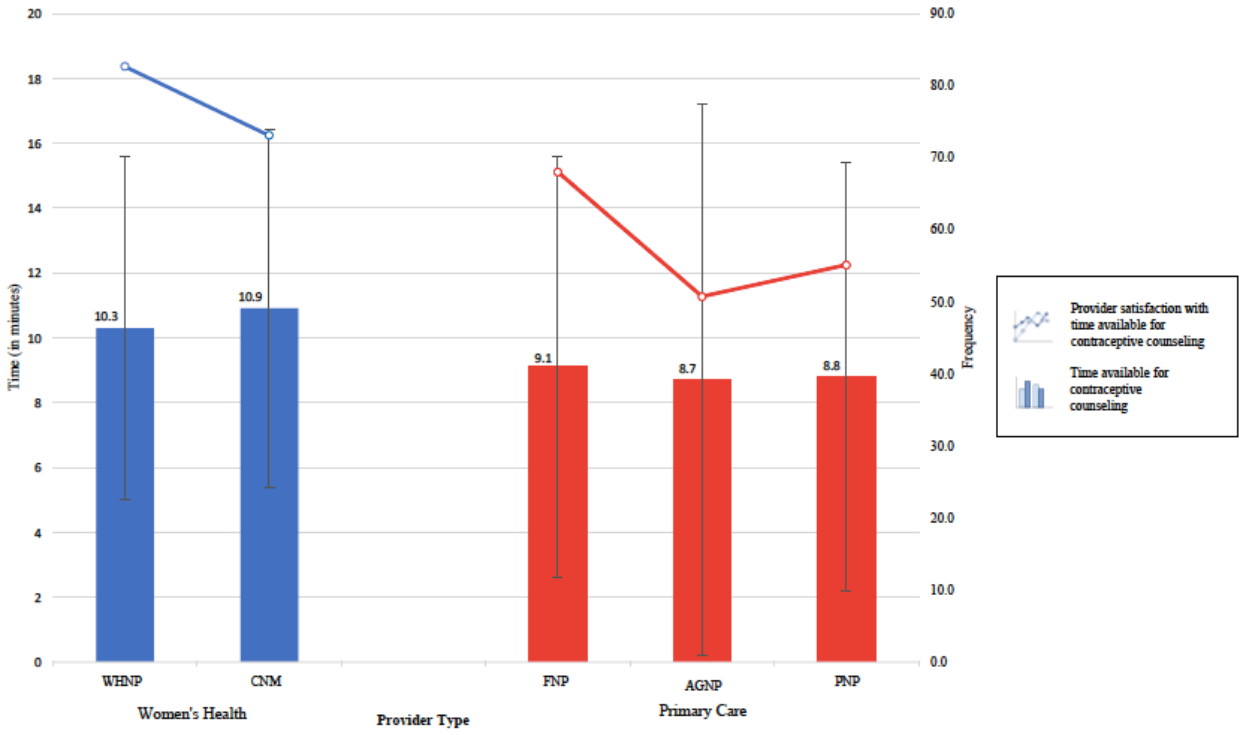

Figure 2. Reported time, in minutes, available to providers for contraceptive counseling and provider satisfaction with time available by provider type. To determine if differences in contraceptive counseling may stem from the amount of time providers have available for a visit, providers were asked to estimate the time they have available during an appointment to provide contraceptive care and if they were satisfied with the time available and felt that they had adequate time available to provide counseling. Reported time available (in minutes) is reflected by the bar graph and satisfaction levels by the line graphs.

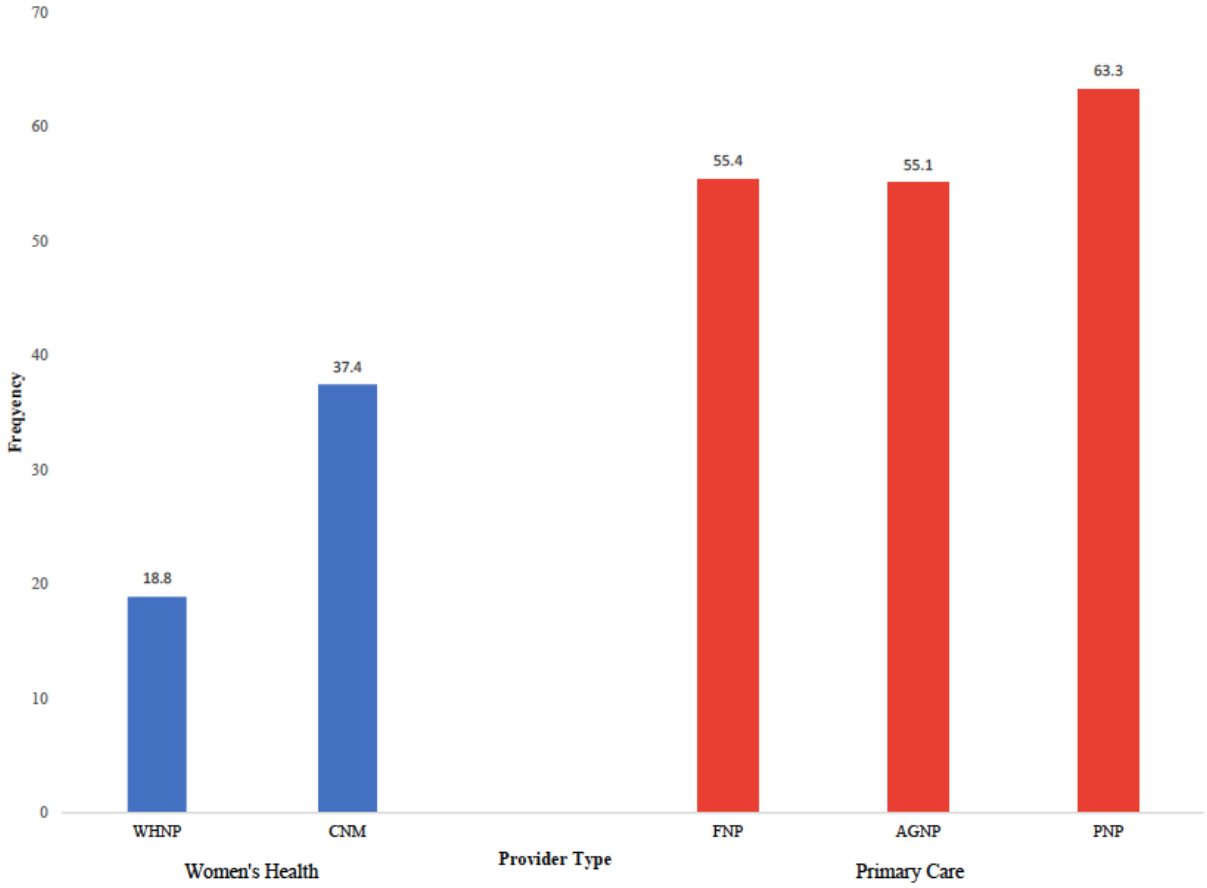

Figure 3. Providers reporting working in clinics where those with prescriptive authority (MD, NP, PA) are solely responsible for contraceptive counseling.

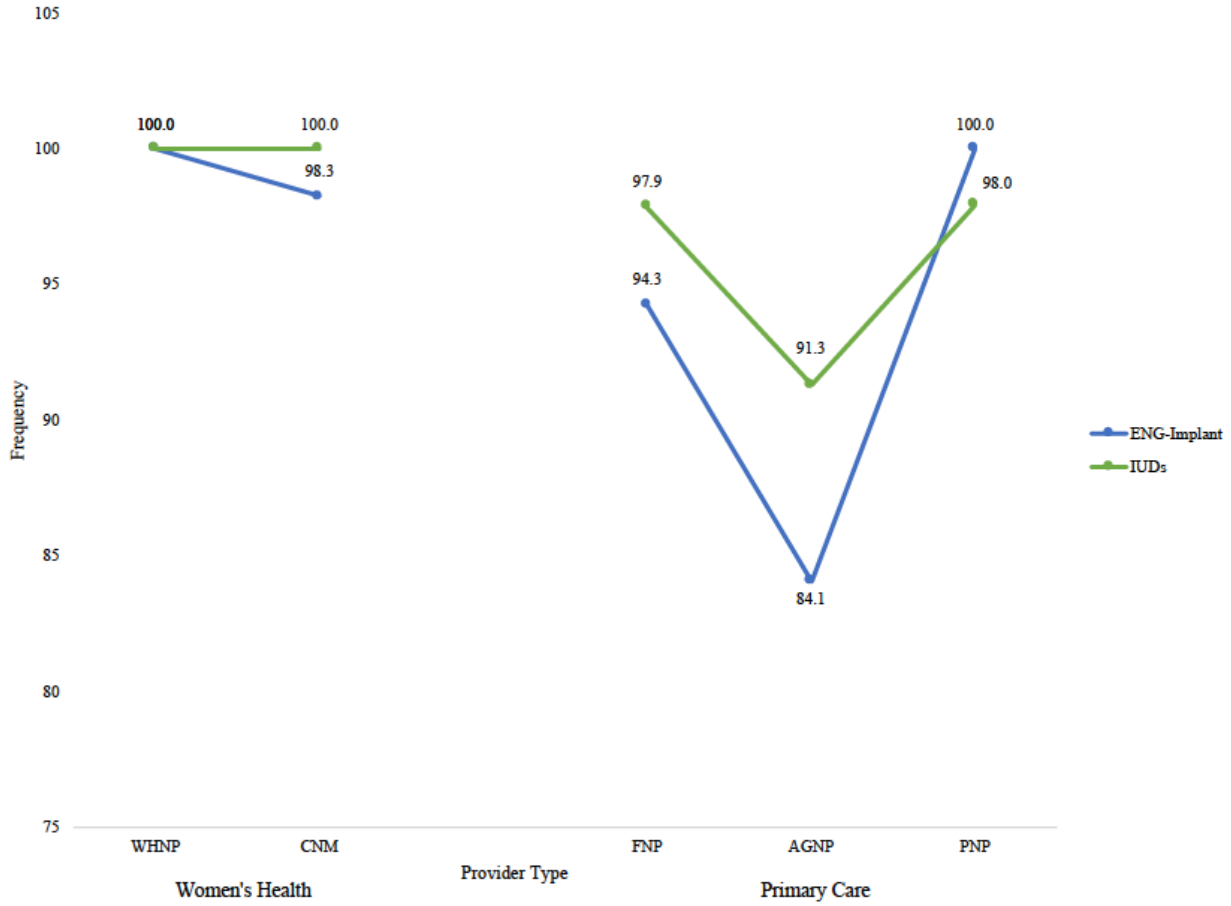

Figure 4. Provider perception of safety of LARC methods.

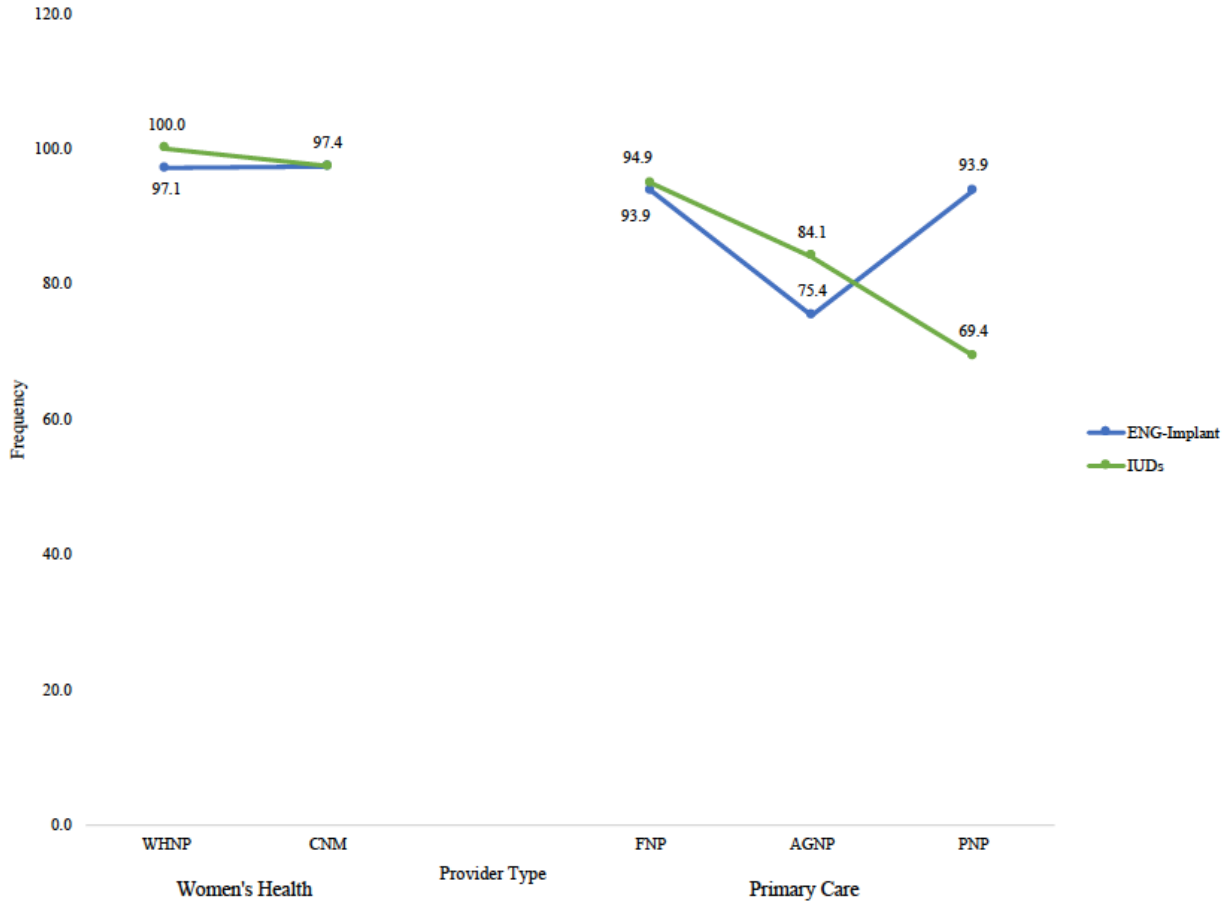

Figure 5. Provider perception of patient receptiveness to learning about LARC methods during contraceptive counseling.

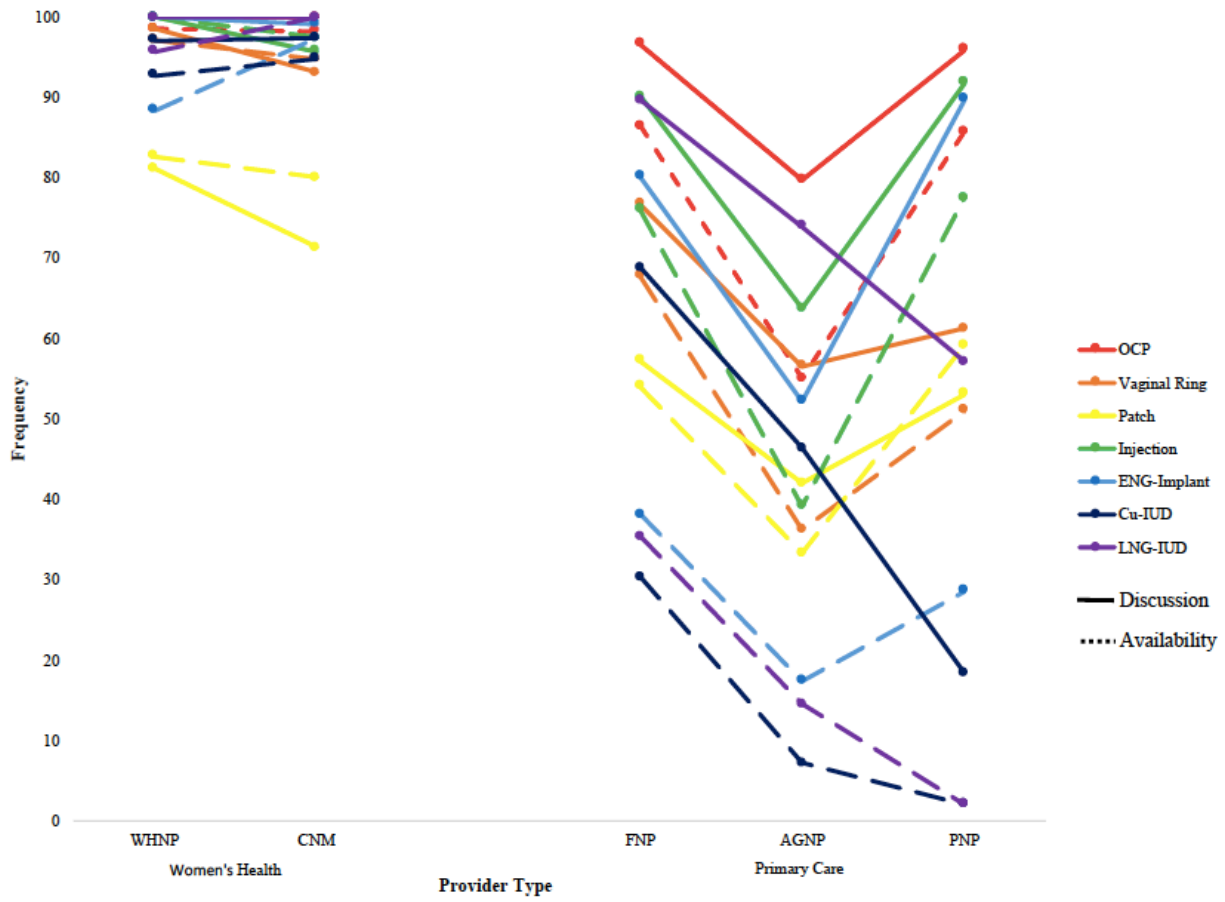

Figure 6. Contraceptive methods discussed during contraceptive counseling versus in-clinic availability of same methods by provider type. Providers were then asked to indicate all of the methods that they discussed, in general, with patients during contraceptive counseling and indicate the methods they would have available in office if patient's were to choose them after counseling was finished. Discussion of a method is indicated by the solid lines and availability of the same method by dashed lines. Each method is represented by a different color.

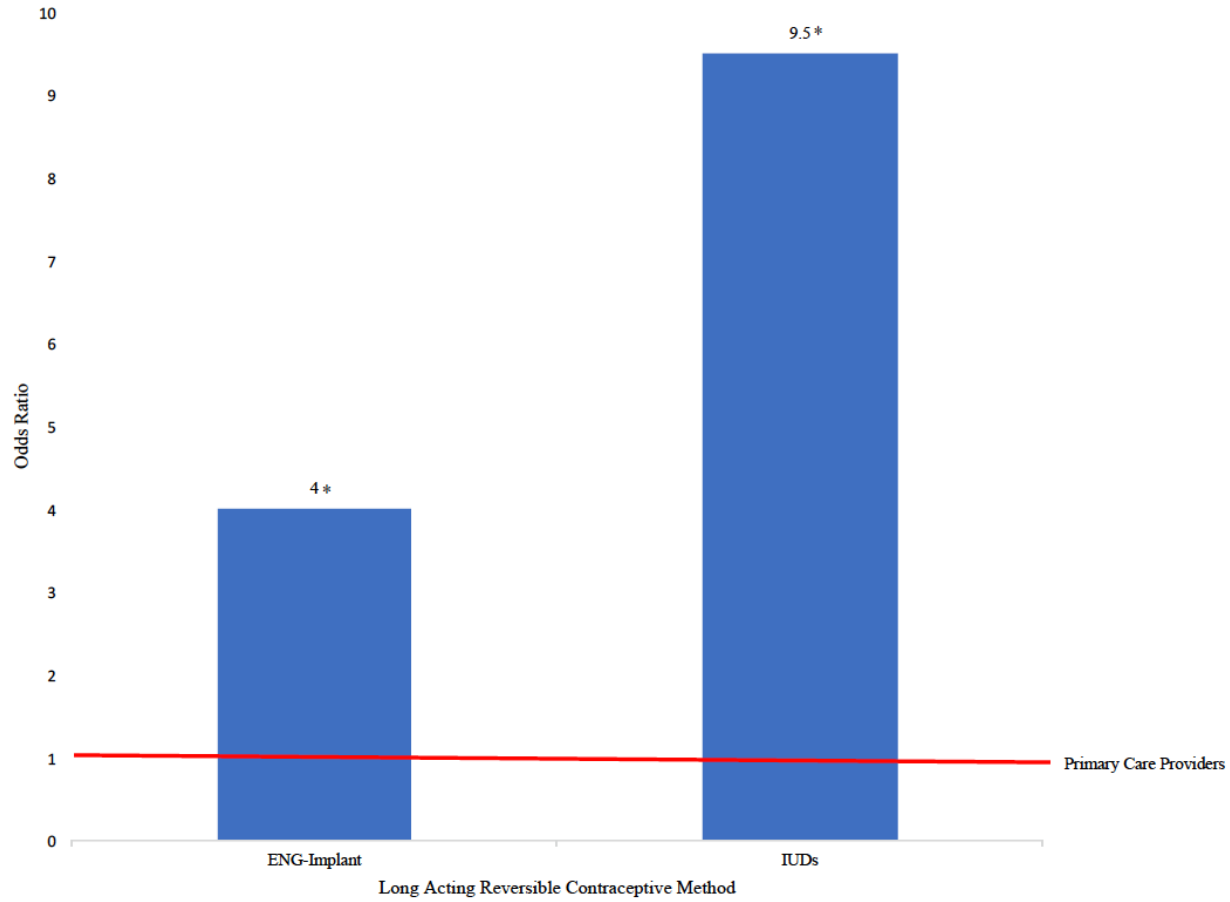

Figure 7. Routine discussion of LARC methods during contraceptive counseling by provider type. Routine discussion was defined as responses indicating providers discussed these methods with either "more than half, but not all" or "all" of their female patients to whom they had provided contraceptive counseling. All odds ratios are compared against primary care providers having an odds ratio of 1. Statistically significant results are indicated as follows:

* p=0.00.

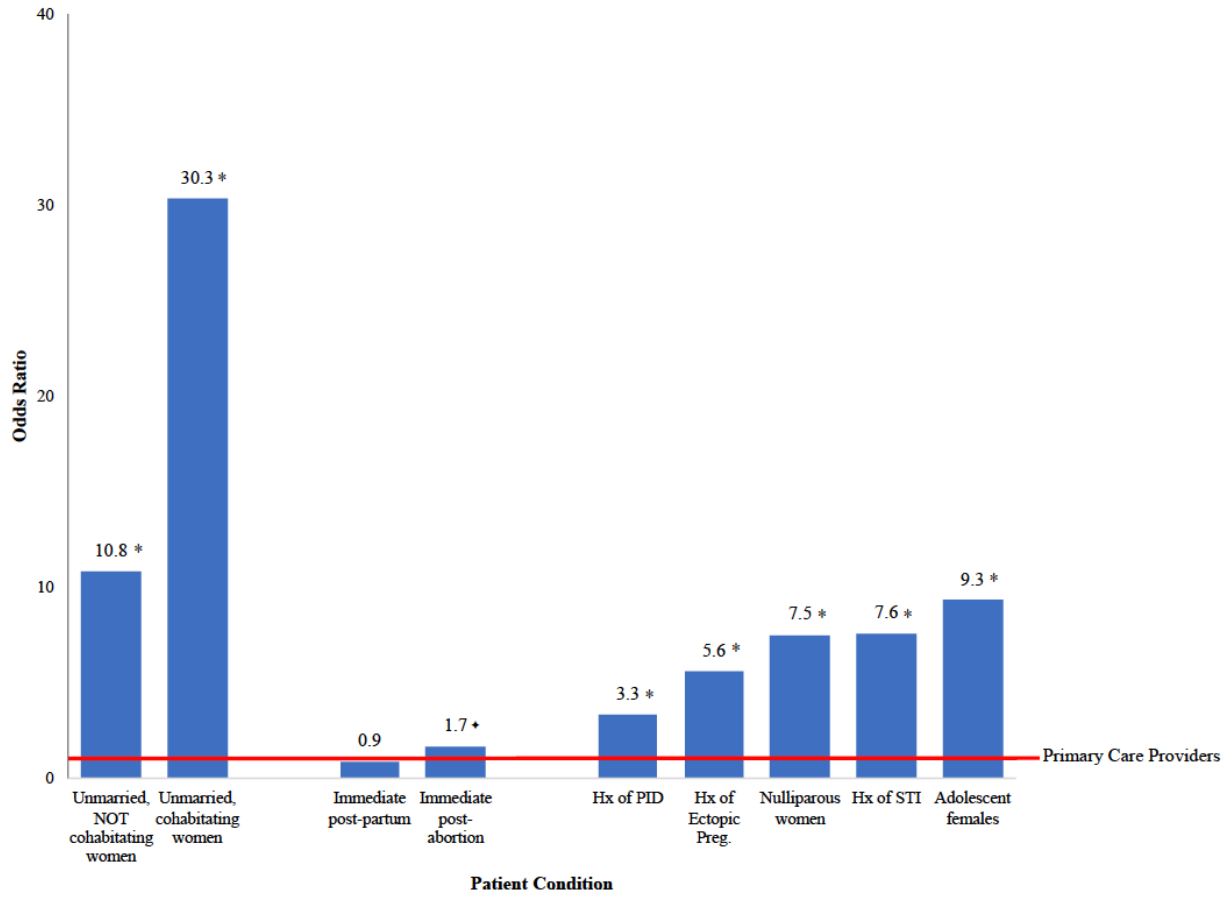

Figure 8. Effect of selected patient conditions on recommendation of IUD during contraceptive counseling by provider type. Respondents were asked about their decision-making during contraceptive counseling as part of a well-woman exam (annual physical) or non-acute follow-up visit when recommending an IUD for patients with a variety of lifestyle choices or medical comorbidities. During analysis, combining responses "no" and "don't know" as one category dichotomized responses. During analysis, provider types were grouped as primary care, FNP, AGNP, and PNP, and women's health, WHNP and CNM. All odds ratios are compared against primary care providers having an odds ratio of 1. Statistically significant results are indicated as follows: * p=<0.0001; ◆ p=0.0014.

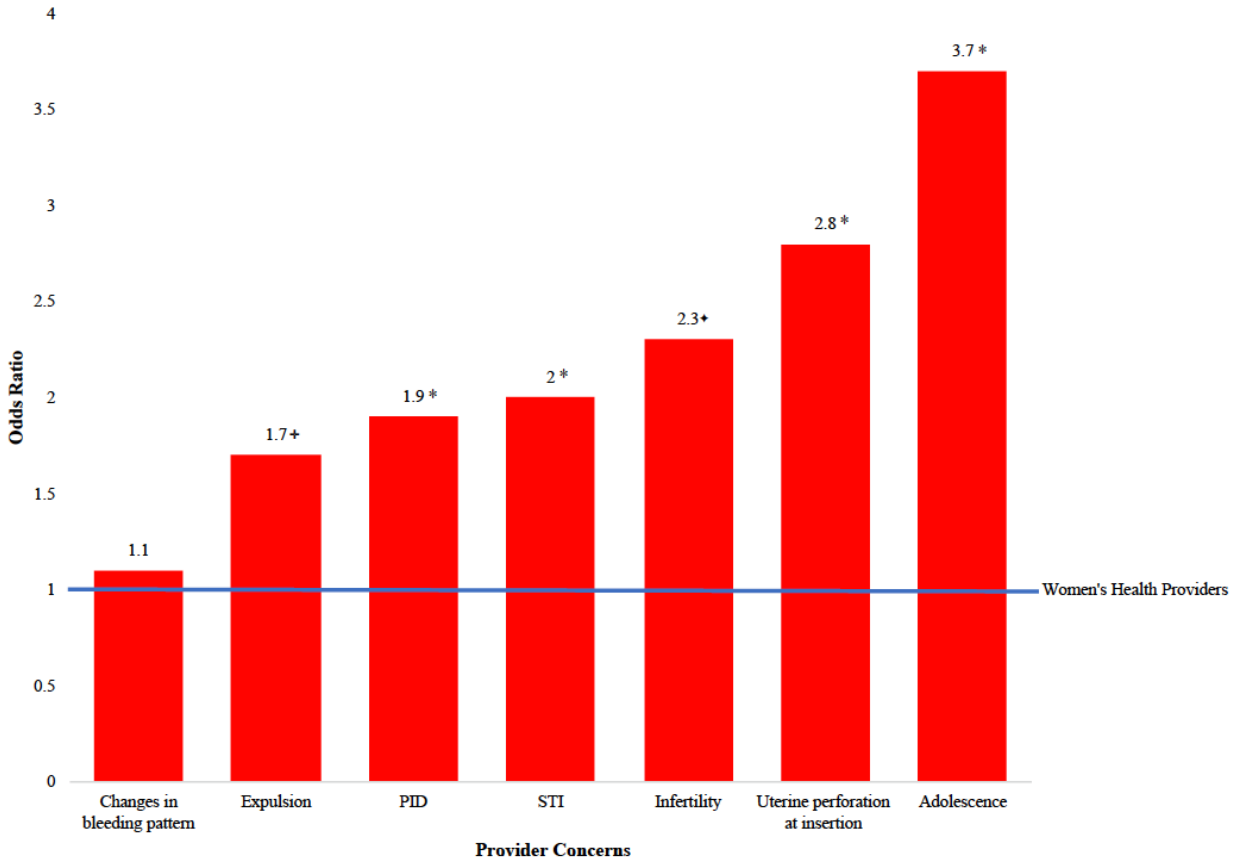

Figure 9. Reported level of provider concern as to selected patient conditions when recommending an IUD during contraceptive counseling by provider type. To assess the relative impact of these concerns participants were asked to consider a selected set of patient conditions and reflect on their relative level of concern for each when considering recommending an IUD. For data analysis, responses indicating a moderate or high level of concern might indicate a provider are unlikely to recommend an IUD to a patient with the condition in question. All odds ratios are compared against women's health providers having an odds ratio of 1. Statistically significant results are indicated as follows: * p=<0.0001; ✦ p=0.0010; ✢ p=0.0113.

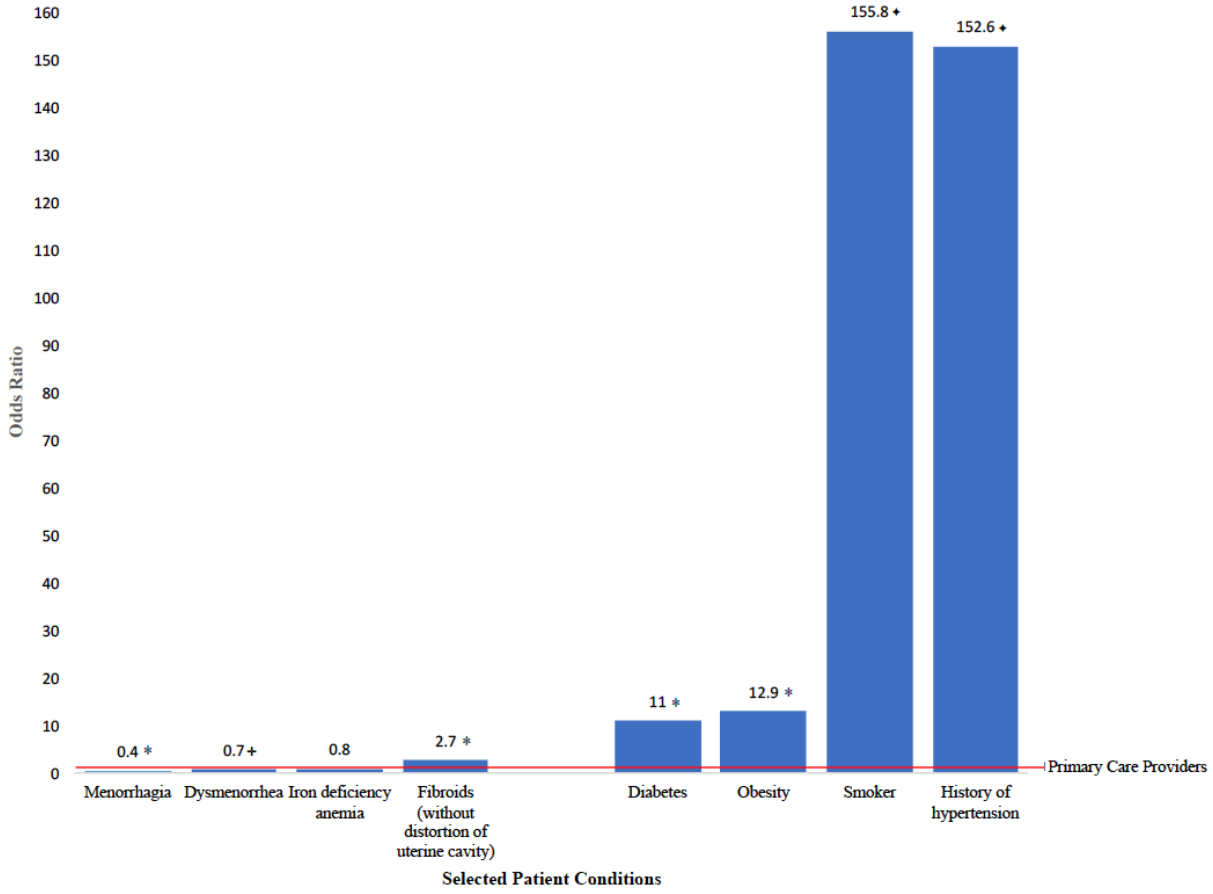

Figure 10. Effect of provider knowledge of appropriate IUD use for selected patient conditions on provider recommendation of the Cu-IUD during contraceptive counseling by provider type. Providers were asked a question to assess their understanding of the MEC by asking if they would consider recommending a Cu-IUD when certain co-morbidities were present. During analysis, combining responses "no" and "don't know" as one category dichotomized responses. Again, provider types were grouped as primary care, FNP, AGNP, and PNP, and women's health, WHNP and CNM. All odds ratios are compared against primary care providers having an odds ratio of 1. Statistically significant results are indicated as follows: * p=<0.0001; ◆ p=0.0004.; ✚ p=0.0494.

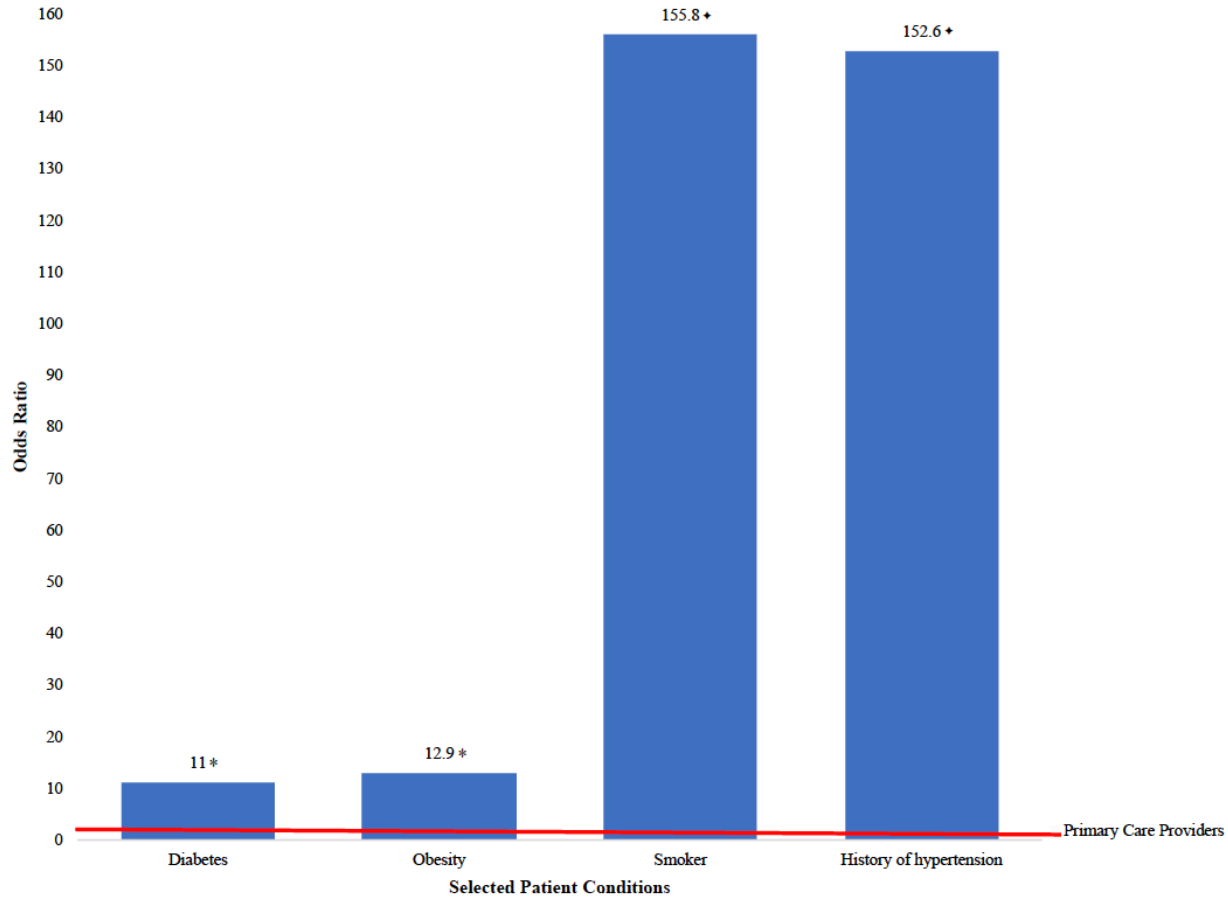

Figure 11. Expanded graph of the effect of provider knowledge of appropriate IUD use for selected patient conditions on provider recommendation of the Cu-IUD during contraceptive counseling by provider type. Providers were asked a question to assess their understanding of the MEC by asking if they would consider recommending a Cu-IUD when certain co-morbidities were present. During analysis, combining responses "no" and "don't know" as one category dichotomized responses. Again, provider types were grouped as primary care, FNP, AGNP, and PNP, and women's health, WHNP and CNM. All odds ratios are compared against primary care providers having an odds ratio of 1. Statistically significant results are indicated as follows: * p=<0.0001; ⬥ p=0.0004.

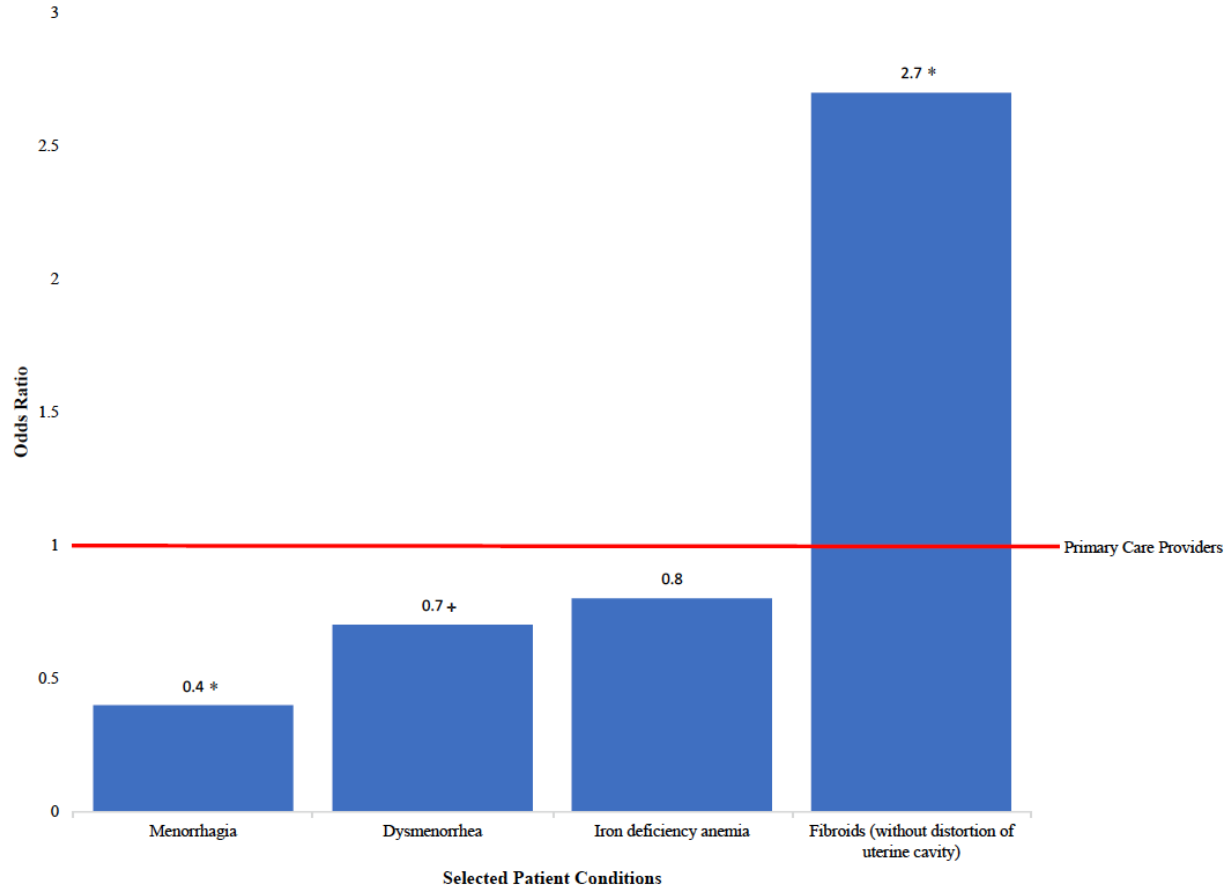

Figure 12. Expanded graph of the effect of provider knowledge of appropriate IUD use for selected patient conditions on provider recommendation of the Cu-IUD during contraceptive counseling by provider type. Providers were asked a question to assess their understanding of the MEC by asking if they would consider recommending a Cu-IUD when certain co-morbidities were present. During analysis, combining responses "no" and "don't know" as one category dichotomized responses. Again, provider types were grouped as primary care, FNP, AGNP, and PNP, and women's health, WHNP and CNM. All odds ratios are compared against primary care providers having an odds ratio of 1. Statistically significant results are indicated as follows: * p=<0.0001; + p=0.0494.

APPENDIX A

Summary Chart of U.S. Medical Eligibility Criteria for Contraceptive Use (CDC, 2010).

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Age		Menarche to <20 yrs:2		Menarche to <20 yrs:2		Menarche to <18 yrs:1		Menarche to <18 yrs:2		Menarche to <18 yrs:1		Menarche to <40 yrs:1	
		≥20 yrs:1		≥20 yrs:1		18-45 yrs:1		18-45 yrs:1		18-45 yrs:1		≥40 yrs:2	
						>45 yrs:1		>45 yrs:2		>45 yrs:1			
Anatomical abnormalities	a) Distorted uterine cavity	4		4									
	b) Other abnormalities	2		2									
Anemias	a) Thalassemia	2		1		1		1		1		1	
	b) Sickle cell disease‡	2		1		1		1		1		2	
	c) Iron-deficiency anemia	2		1		1		1		1		1	
Benign ovarian tumors	(*including cysts*)	1		1		1		1		1		1	
Breast disease	a) Undiagnosed mass	1		2		2*		2*		2*		2*	
	b) Benign breast disease	1		1		1		1		1		1	
	c) Family history of cancer	1		1		1		1		1		1	
	d) Breast cancer‡												
	i) Current	1		4		4		4		4		4	
	ii) Past and no evidence of current disease for 5 years	1		3		3		3		3		3	
Breastfeeding	a) <21 days postpartum					2*		2*		2*		4*	
	b) 21 to <30 days postpartum												
	i) With other risk factors for VTE					2*		2*		2*		3*	
	ii) Without other risk factors for VTE					2*		2*		2*		3*	
	c) 30-42 days postpartum												
	i) With other risk factors for VTE					1*		1*		1*		3*	
	ii) Without other risk factors for VTE					1*		1*		1*		2*	
	d) >42 days postpartum					1*		1*		1*		2*	
Cervical cancer	Awaiting treatment	4	2	4	2	2		2		1		2	
Cervical ectropion		1		1		1		1		1		1	
Cervical intraepithelial neoplasia		1		2		2		2		1		2	
Cirrhosis	a) Mild (*compensated*)	1		1		1		1		1		1	
	b) Severe‡ (*decompensated*)	1		3		3		3		3		4	
Cystic fibrosis‡		1*		1*		1*		2*		1*		1*	
Deep venous thrombosis (DVT)/Pulmonary embolism (PE)	a) History of DVT/PE, not receiving anticoagulant therapy												
	i) Higher risk for recurrent DVT/PE	1		2		2		2		2		4	
	ii) Lower risk for recurrent DVT/PE	1		2		2		2		2		3	
	b) Acute DVT/PE	2		2		2		2		2		4	
	c) DVT/PE and established anticoagulant therapy for at least 3 months												
	i) Higher risk for recurrent DVT/PE	2		2		2		2		2		4*	
	ii) Lower risk for recurrent DVT/PE	2		2		2		2		2		3*	
	d) Family history (*first-degree relatives*)	1		1		1		1		1		2	
	e) Major surgery												
	i) With prolonged immobilization	1		2		2		2		2		4	
	ii) Without prolonged immobilization	1		1		1		1		1		2	
	f) Minor surgery without immobilization	1		1		1		1		1		1	
Depressive disorders		1*		1*		1*		1*		1*		1*	

Key:	
1 No restriction (method can be used)	3 Theoretical or proven risks usually outweigh the advantages
2 Advantages generally outweigh theoretical or proven risks	4 Unacceptable health risk (method not to be used)

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Diabetes	a) History of gestational disease	1		1		1		1		1		1	
	b) Nonvascular disease												
	i) Non-insulin dependent	1		2		2		2		2		2	
	ii) Insulin dependent	1		2		2		2		2		2	
	c) Nephropathy/retinopathy/neuropathy‡	1		2		2		3		2		3/4*	
	d) Other vascular disease or diabetes of >20 years' duration‡	1		2		2		3		2		3/4*	
Dysmenorrhea	Severe	2		1		1		1		1		1	
Endometrial cancer‡		4	2	4	2	1		1		1		1	
Endometrial hyperplasia		1		1		1		1		1		1	
Endometriosis		2		1		1		1		1		1	
Epilepsy‡	(*see also Drug Interactions*)	1		1		1*		1*		1*		1*	
Gallbladder disease	a) Symptomatic												
	i) Treated by cholecystectomy	1		2		2		2		2		2	
	ii) Medically treated	1		2		2		2		2		3	
	iii) Current	1		2		2		2		2		3	
	b) Asymptomatic	1		2		2		2		2		2	
Gestational trophoblastic disease‡	a) Suspected GTD (immediate postevacuation)												
	i) Uterine size first trimester	1*		1*		1*		1*		1*		1*	
	ii) Uterine size second trimester	2*		2*		1*		1*		1*		1*	
	b) Confirmed GTD												
	i) Undetectable/non-pregnant ß-hCG levels	1*	1*	1*	1*	1*		1*		1*		1*	
	ii) Decreasing ß-hCG levels	2*	1*	2*	1*	1*		1*		1*		1*	
	iii) Persistently elevated ß-hCG levels or malignant disease, with no evidence or suspicion of intrauterine disease	2*	1*	2*	1*	1*		1*		1*		1*	
	iv) Persistently elevated ß-hCG levels or malignant disease, with evidence or suspicion of intrauterine disease	4*	2*	4*	2*	1*		1*		1*		1*	
Headaches	a) Nonmigraine (mild or severe)	1		1		1		1		1		1*	
	b) Migraine												
	i) Without aura (includes menstrual migraine)	1		1		1		1		1		2*	
	ii) With aura	1		1		1		1		1		4*	
History of bariatric surgery‡	a) Restrictive procedures	1		1		1		1		1		1	
	b) Malabsorptive procedures	1		1		1		1		3		COCs: 3 P/R: 1	
History of cholestasis	a) Pregnancy related	1		1		1		1		1		2	
	b) Past COC related	1		2		2		2		2		3	
History of high blood pressure during pregnancy		1		1		1		1		1		2	
History of Pelvic surgery		1		1		1		1		1		1	
HIV	a) High risk for HIV	2	2	2	2	1		1*		1		1	
	b) HIV infection					1*		1*		1*		1*	
	i) Clinically well receiving ARV therapy	1	1	1	1	If on treatment, see Drug Interactions							
	ii) Not clinically well or not receiving ARV therapy‡	2	1	2	1	If on treatment, see Drug Interactions							

Key:	
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2 Advantages generally outweigh theoretical or proven risks	4 Unacceptable health risk (method not to be used)

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Hypertension	a) Adequately controlled hypertension	1*		1*		1*		2*		1*		3*	
	b) Elevated blood pressure levels (*properly taken measurements*)												
	i) Systolic 140-159 or diastolic 90-99	1*		1*		1*		2*		1*		3*	
	ii) Systolic ≥160 or diastolic ≥100[‡]	1*		2*		2*		3*		2*		4*	
	c) Vascular disease	1*		2*		2*		3*		2*		4*	
Inflammatory bowel disease	(*Ulcerative colitis, Crohn's disease*)	1		1		1		2		2		2/3*	
Ischemic heart disease[‡]	Current and history of	1		2	3	2	3	3		2	3	4	
Known thrombogenic mutations[‡]		1*		2*		2*		2*		2*		4*	
Liver tumors	a) Benign												
	i) Focal nodular hyperplasia	1		2		2		2		2		2	
	ii) Hepatocellular adenoma[‡]	1		3		3		3		3		4	
	b) Malignant[‡] (hepatoma)	1		3		3		3		3		4	
Malaria		1		1		1		1		1		1	
Multiple risk factors for atherosclerotic cardiovascular disease	(e.g., older age, smoking, diabetes, hypertension, low HDL, high LDL, or high triglyceride levels)	1		2		2*		3*		2*		3/4*	
Multiple sclerosis	a) With prolonged immobility	1		1		1		2		1		3	
	b) Without prolonged immobility	1		1		1		2		1		1	
Obesity	a) Body mass index (BMI) ≥30 kg/m^2	1		1		1		1		1		2	
	b) Menarche to <18 years and BMI ≥ 30 kg/m^2	1		1		1		2		1		2	
Ovarian cancer[‡]		1		1		1		1		1		1	
Parity	a) Nulliparous	2		2		1		1		1		1	
	b) Parous	1		1		1		1		1		1	
Past ectopic pregnancy		1		1		1		1		2		1	
Pelvic inflammatory disease	a) Past												
	i) With subsequent pregnancy	1	1	1	1	1		1		1		1	
	ii) Without subsequent pregnancy	2	2	2	2	1		1		1		1	
	b) Current	4	2*	4	2*	1		1		1		1	
Peripartum cardiomyopathy[‡]	a) Normal or mildly impaired cardiac function												
	i) <6 months	2		2		1		1		1		4	
	ii) ≥6 months	2		2		1		1		1		3	
	b) Moderately or severely impaired cardiac function	2		2		2		2		2		4	
Postabortion	a) First trimester	1*		1*		1*		1*		1*		1*	
	b) Second trimester	2*		2*		1*		1*		1*		1*	
	c) Immediate postseptic abortion	4		4		1*		1*		1*		1*	
Postpartum (*nonbreastfeeding women*)	a) <21 days					1		1		1		4	
	b) 21 days to 42 days												
	i) With other risk factors for VTE					1		1		1		3*	
	ii) Without other risk factors for VTE					1		1		1		2	
	c) >42 days					1		1		1		1	
Postpartum (*in breastfeeding or non-breastfeeding women, including cesarean delivery*)	a) <10 minutes after delivery of the placenta												
	i) Breastfeeding	1*		2*									
	ii) Nonbreastfeeding	1*		1*									
	b) 10 minutes after delivery of the placenta to <4 weeks	2*		2*									
	c) ≥4 weeks	1*		1*									
	d) Postpartum sepsis	4		4									

Key:	
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2 Advantages generally outweigh theoretical or proven risks	4 Unacceptable health risk (method not to be used)

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Pregnancy		4*		4*		NA*		NA*		NA*		NA*	
Rheumatoid arthritis	a) On immunosuppressive therapy	2	1	2	1	1		2/3*		1		2	
	b) Not on immunosuppressive therapy	1		1		1		2		1		2	
Schistosomiasis	a) Uncomplicated	1		1		1		1		1		1	
	b) Fibrosis of the liver‡	1		1		1		1		1		1	
Sexually transmitted diseases (STDs)	a) Current purulent cervicitis or chlamydial infection or gonococcal infection	4	2*	4	2*	1		1		1		1	
	b) Vaginitis (*including trichomonas vaginalis and bacterial vaginosis*)	2	2	2	2	1		1		1		1	
	c) Other factors relating to STDs	2*	2	2*	2	1		1		1		1	
Smoking	a) Age <35	1		1		1		1		1		2	
	b) Age ≥35, <15 cigarettes/day	1		1		1		1		1		3	
	c) Age ≥35, ≥15 cigarettes/day	1		1		1		1		1		4	
Solid organ transplantation‡	a) Complicated	3	2	3	2	2		2		2		4	
	b) Uncomplicated	2		2		2		2		2		2*	
Stroke‡	History of cerebrovascular accident	1		2		2	3	3		2	3	4	
Superficial venous disorders	a) Varicose veins	1		1		1		1		1		1	
	b) Superficial venous thrombosis (acute or history)	1		1		1		1		1		3*	
Systemic lupus erythematosus‡	a) Positive (or unknown) antiphospholipid antibodies	1*	1*	3*		3*		3*	3*	3*		4*	
	b) Severe thrombocytopenia	3*	2*	2*		2*		3*	2*	2*		2*	
	c) Immunosuppressive therapy	2*	1*	2*		2*		2*	2*	2*		2*	
	d) None of the above	1*	1*	2*		2*		2*	2*	2*		2*	
Thyroid disorders	Simple goiter/ hyperthyroid/hypothyroid	1		1		1		1		1		1	
Tuberculosis‡ *(see also Drug Interactions)*	a) Nonpelvic	1	1	1	1	1*		1*		1*		1*	
	b) Pelvic	4	3	4	3	1*		1*		1*		1*	
Unexplained vaginal bleeding	(suspicious for serious condition) before evaluation	4*	2*	4*	2*	3*		3*		2*		2*	
Uterine fibroids		2		2		1		1		1		1	
Valvular heart disease	a) Uncomplicated	1		1		1		1		1		2	
	b) Complicated‡	1		1		1		1		1		4	
Vaginal bleeding patterns	a) Irregular pattern without heavy bleeding	1		1	1	2		2		2		1	
	b) Heavy or prolonged bleeding	2*		1*	2*	2*		2*		2*		1*	
Viral hepatitis	a) Acute or flare	1		1		1		1		1		3/4*	2
	b) Carrier/Chronic	1		1		1		1		1		1	1
Drug Interactions													
Antiretroviral therapy All other ARV's are 1 or 2 for all methods.	Fosamprenavir (FPV)	1/2*	1*	1/2*	1*	2*		2*		2*		3*	
Anticonvulsant therapy	a) Certain anticonvulsants (phenytoin, carbamazepine, barbiturates, primidone, topiramate, oxcarbazepine)	1		1		2*		1*		3*		3*	
	b) Lamotrigine	1		1		1		1		1		3*	
Antimicrobial therapy	a) Broad spectrum antibiotics	1		1		1		1		1		1	
	b) Antifungals	1		1		1		1		1		1	
	c) Antiparasitics	1		1		1		1		1		1	
	d) Rifampin or rifabutin therapy	1		1		2*		1*		3*		3*	
SSRIs		1		1		1		1		1		1	
St. John's wort		1		1		2		1		2		2	

Key:	
1 No restriction (method can be used)	3 Theoretical or proven risks usually outweigh the advantages
2 Advantages generally outweigh theoretical or proven risks	4 Unacceptable health risk (method not to be used)

Abbreviations: C=continuation of contraceptive method; CHC=combined hormonal contraception (pill, patch, and, ring); COC=combined oral contraceptive; Cu-IUD=copper-containing intrauterine device; DMPA = depot medroxyprogesterone acetate; I=initiation of contraceptive method; LNG-IUD=levonorgestrel-releasing intrauterine device; NA=not applicable; POP=progestin-only pill; P/R=patch/ring ‡ Condition that exposes a woman to increased risk as a result of pregnancy. *Please see the complete guidance for a clarification to this classification: www.cdc.gov/reproductivehealth/unintendedpregnancy/USMEC.htm.

APPENDIX B

Contraceptive Clinical Practice Survey

You are invited to take part in a survey about contraceptive clinical practice among advanced practice registered nurses (APRNs) in North Carolina. This survey is being disseminated as part of a research study. Your participation will require approximately 8 minutes. There are no known risks or discomforts associated with this survey. Benefits of participating in this include furthering understanding of how contraceptive clinical practice varies among practitioners. Taking part in this study is completely voluntary. If you choose to be in the study you can withdraw at any time without adversely affecting your relationship with anyone at The University of North Carolina. Your responses will be kept strictly confidential, and digital data will be stored in secure computer files. Any report of this research that is made available to the public will not include your name or any other individual information by which you could be identified. If you have questions or want a copy or summary of this study's results, you can contact the researcher at the email address below. If you have any questions about whether you have been treated in an illegal or unethical way, contact the University of North Carolina Institutional Research Board at (919) 966-3113. Please feel free to print a copy of this consent page to keep for your records.

Clicking the "Next" button below indicates that you are 18 years of age or older, and indicates your consent to participate in this survey.

Thank you for taking part, Emily Ryan, MA, BSN, RN
The University of North Carolina School of Nursing
eradford@email.unc.edu

1. In the past 12 months, in your current position, have you had at least one occasion to provide contraception counseling to your patients?

- ❍ Yes (1)
- ❍ No (2)

Forced Response: If Yes is Selected, Then Skip to Question 2; If No Is Selected, End and Exit Survey

CURRENT CONTRACEPTIVE CLINICAL PRACTICE

The following section asks about your current contraceptive clinical practice. It is not meant to be an evaluation of your knowledge. Rather, it seeks to identify how practitioners are able to provide contraceptive care in real world settings. Therefore, please answer all of the following questions from memory to the best of your ability.

2. In a typical week, approximately how many patients do you see for family planning services?

The WHO defines family planning as services that "allow individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births. It is achieved through use of contraceptive methods and the treatment of involuntary infertility." (WHO, 2016)

3. For your female patients of reproductive age, ages 15-49, how many need contraception counseling, in your opinion?

- ❍ None (1)
- ❍ Some, but less than half (2)
- ❍ About half (3)
- ❍ More than half, but not all (4)
- ❍ All (5)

4. Please think about your practice during well woman visits (annual physical) and/or non-acute follow up appointments for the following question. With what proportion, do you discuss contraception with the following groups?

	None (1)	Some, but less than half (2)	About half (3)	More than half, but not all (4)	All (5)
Women in general (1)	❍	❍	❍	❍	❍
Married Women (2)	❍	❍	❍	❍	❍
Unmarried, cohabitating women (3)	❍	❍	❍	❍	❍
Unmarried, NOT cohabitating women (4)	❍	❍	❍	❍	❍
Adolescent females (age 15-19) (5)	❍	❍	❍	❍	❍

5. How much influence do you feel you have on your patients' . . .?

	None at all (1)	A little (2)	A moderate amount (3)	A lot (4)	A great deal (5)
CHOICE of contraceptive method (1)	❍	❍	❍	❍	❍
CORRECT USE of contraceptive method (2)	❍	❍	❍	❍	❍
CONTINUATION with method (3)	❍	❍	❍	❍	❍

6. Do you feel you generally have enough time to counsel patients on their contraceptive options?

❍ Yes (1)

❍ No (2)

7. During a well woman visit (annual physical) and/or non-acute follow up, approximately how much time (in minutes) do you have available to counsel patients on their contraceptive options? Please enter a number.

8. Who else, without prescriptive authority, in your practice provides contraception counseling to patients, if anyone? Check all that apply.

- ❑ RN (1)
- ❑ LPN (2)
- ❑ Social Worker (3)
- ❑ Peer Counselor (4)
- ❑ Other (5) _____
- ❑ No one (6)

9. Which, if any, of these contraceptive methods do you currently discuss with patients during contraceptive counseling? Check all that apply.

- ❑ None (1)
- ❑ Male Condoms (2)
- ❑ Female Condoms (3)
- ❑ Diaphragm (4)
- ❑ Oral Contraceptive Pill (OCP) (5)
- ❑ Vaginal Ring (NuvaRing®) (6)
- ❑ Patch (ORTHO EVRA®) (7)
- ❑ Injection (Depo-Provera®) (8)
- ❑ Implant (Nexplanon®) (9)
- ❑ IUD-Copper (Paragard®) (10)
- ❑ IUD-levonorgestril-releasing (Mirena®, Liletta®, Skyla®) (11)
- ❑ Emergency Contraceptive Pill (12)

10. Which, if any, of these contraceptive method services do you currently offer to patients in your clinic? Check all that apply.

- ❑ None (1)
- ❑ Diaphragm- provide in clinic fitting (2)
- ❑ Oral Contraceptive Pill (OCP)- samples and/or prescription (3)
- ❑ Vaginal Ring (NuvaRing®) - samples and/or prescription (4)
- ❑ Patch (ORTHO EVRA®) - samples and/or prescription (5)
- ❑ Injection (Depo-Provera®) - provide in clinic administration (6)
- ❑ Implant (Nexplanon®) - provide in clinic insertion (7)
- ❑ IUD-Copper (Paragard®) - provide in clinic insertion (8)
- ❑ IUD-levonorgestril-releasing (Mirena®, Liletta® Skyla®) - provide in clinic insertion (9)
- ❑ Emergency Contraceptive Pill - samples and/or prescription (10)

11. In which of these methods, if any, would you like (more) training? Check all that apply. Training would include informational brochures or attending educational programs where you would learn about counseling patients in various methods and inserting the long acting, reversible (LARC) methods.

- ❑ None (1)
- ❑ Diaphragm (2)
- ❑ Oral Contraceptive Pill (OCP) (3)
- ❑ Vaginal Ring (NuvaRing®) (4)
- ❑ Patch (ORTHO EVRA®) (5)
- ❑ Injection (Depo-Provera®) (6)
- ❑ Implant (Nexplanon®) (7)
- ❑ IUD-Copper (Paragard®) (8)
- ❑ IUD-levonorgestril-releasing (Mirena®, Liletta®, Skyla®) (9)
- ❑ Emergency Contraceptive Pill (10)

12. Among your female patients to whom you have provided contraceptive counseling in the past 12 months, with how many did you discuss any of the various intrauterine devices (IUDs)- Paragard®, Mirena®, Liletta®, Skyla®

- ❍ None (1)
- ❍ Some, but less than half (2)
- ❍ About half (3)
- ❍ More than half, but not all (4)
- ❍ All (5)

13. Do you consider the intrauterine devices (IUDs)- Paragard®, Mirena®, Liletta®, Skyla®- to be underutilized by your patient population?

- ❍ Yes (1)
- ❍ No (2)

14. Do you consider the intrauterine devices (IUDs)- Paragard®, Mirena®, Liletta®, Skyla®- to be safe methods?

- ❍ Yes (1)
- ❍ No (2)

15. Among your female patients, to whom you have provided contraceptive counseling in the past 12 months, with how many did you discuss the implant- Nexplanon®

- ❍ None (1)
- ❍ Some, but less than half (2)
- ❍ About half (3)
- ❍ More than half, but not all (4)
- ❍ All (5)

16. Do you consider the implant- Nexplanon®- to be underutilized by your patient population?
- ❍ Yes (1)
- ❍ No (2)

17. Do you consider the implant- Nexplanon®- to be a safe method?
- ❍ Yes (1)
- ❍ No (2)

18. During your residency or training did you insert any intrauterine devices (IUDs) -Paragard®, Mirena®, Liletta®, or Skyla®? Residency or training is defined as either a post-graduate NP residency and/or clinical rotations or hours performed as part of your educational program.
- ❍ Yes (1)
- ❍ No (2)

19. During your residency or training, did you insert any implants - Nexplanon® or Implanon®? Residency or training is defined as either a post-graduate NP residency and/or clinical rotations or hours performed as part of your educational program.
- ❍ Yes (1)
- ❍ No (2)

20. Have you sought out post-graduate training to learn how to insert long acting, reversible contraception methods (LARCs) including intrauterine devices (IUDs-Paragard®, Mirena®, Liletta®, or Skyla®) or implants (Nexplanon® or Implanon®)? Post graduate training includes attending contraceptive technology conferences or manufacturer sponsored educational programs where you were taught how to insert and remove these methods.
- ❍ Yes (1)
- ❍ No (2)

If No Is Selected, Then Skip To Question 22

21. Which type of long acting, reversible contraception methods (LARCs) did you receive post-graduate training in insertion techniques? Check all that apply.
- ☐ Copper T 380 A (Paragard®) (1)
- ☐ Levonorgestrel-releasing system (Mirena®, Liletta®, or Skyla®) (2)
- ☐ Implant (Nexplanon®) (3)

22. Are you comfortable inserting the following methods?

	Yes (1)	Somewhat (2)	No (3)
Copper T 380 A (Paragard®) (1)	❍	❍	❍
Levonorgestrel-releasing system (Mirena®, Liletta®, or Skyla®) (2)	❍	❍	❍
Implant (Nexplanon®) (3)	❍	❍	❍

23. During contraceptive counseling you provide as part of a well woman exam (annual physical) or non-acute follow up visit, would you consider recommending an intrauterine device (IUD-Paragard®, Mirena®, Liletta®, and/or Skyla®) for the following patients?

	Yes (1)	No (2)	Don't Know (3)
Nulliparous women (no births) (1)	❍	❍	❍
Unmarried, cohabitating women (2)	❍	❍	❍
Unmarried, NOT cohabitating women (3)	❍	❍	❍
Immediate post-partum (prior to discharge) (4)	❍	❍	❍
Immediate post-abortion (before leaving clinic) (5)	❍	❍	❍
History of sexually transmitted infections (STI) in past 2 years (6)	❍	❍	❍
History of pelvic inflammatory disease (PID) (7)	❍	❍	❍
History of ectopic pregnancy (8)	❍	❍	❍
Adolescent females (age 15-19) (9)	❍	❍	❍

24. How big a concern, if any, is each of the following for you when deciding whether to recommend an intrauterine device (IUD-Paragard®, Mirena®, Liletta®, and/or Skyla®) during contraceptive counseling?

	No concern (1)	Minor concern (2)	Moderate concern (3)	Major concern (4)
Uterine perforation at insertion (1)	❍	❍	❍	❍
Expulsion (2)	❍	❍	❍	❍
Sexually transmitted infections (STI) (3)	❍	❍	❍	❍
Pelvic inflammatory disease (PID) (4)	❍	❍	❍	❍
Adolescent age (15-19 years) (5)	❍	❍	❍	❍
Infertility (6)	❍	❍	❍	❍
Changes in bleeding pattern (7)	❍	❍	❍	❍

25. Would you consider the Copper T 380 A (Paragard®) for a patient with . . . ?

	Yes (1)	No (2)	Don't Know (3)
Menorrhagia (1)	❍	❍	❍
Dysmenorrhea (2)	❍	❍	❍
Fibroids (without distortion of uterine cavity) (3)	❍	❍	❍
Diabetes (4)	❍	❍	❍
Obesity (5)	❍	❍	❍
Smoker (6)	❍	❍	❍
History of hypertension (7)	❍	❍	❍
Iron deficiency anemia (8)	❍	❍	❍

26. Do you consider cost to the patient when deciding to recommend each of the following methods to patients you provide contraceptive counseling?

	Yes (1)	No (2)
Copper T 380 A (Paragard®) (1)	❍	❍
Levonorgestrel-releasing system (Mirena®, Liletta®, or Skyla®) (2)	❍	❍
Implant (Nexplanon®) (3)	❍	❍

27. In general, do you feel that cost is a prohibitive factor for each of the following methods for your patient population?

	Yes (1)	No (2)
Copper T 380 A (Paragard®) (1)	❍	❍
Levonorgestrel-releasing system (Mirena®, Liletta®, or Skyla®) (2)	❍	❍
Implant (Nexplanon®) (3)	❍	❍

28. Do you think your patients are receptive to learning about intrauterine devices (IUDs-Paragard®, Mirena®, Liletta®, or Skyla®)?
- ❍ Yes (1)
- ❍ No (2)

29. Do you think your patients are receptive to learning about the implant (Nexplanon®)?
- ❍ Yes (1)
- ❍ No (2)

PROVIDER DEMOGRAPHICS

The next section asks about your demographic and educational information.

30. What is your gender?
- ❍ Male (1)
- ❍ Female (2)
- ❍ Other, specify (3) _____

31. What is your date of birth (MM/DD/YYYY)

32. What race do you consider yourself? Check all that apply

- ❑ White (1)
- ❑ Black or African American (2)
- ❑ American Indian or Alaska Native (3)
- ❑ Asian (4)
- ❑ Native Hawaiian or Pacific Islander (5)
- ❑ Other, specify (6) _____

33. Do you consider yourself Hispanic or Latino?
- ❍ Yes (1)
- ❍ No (2)

34. What are your professional qualifications? Check all that apply
- ❑ Family Nurse Practitioner (FNP) (1)
- ❑ Women's Health Nurse Practitioner (WHNP) / Obstetrics & Gynecology Nurse Practitioner (OGNP) (2)
- ❑ Adult/Geriatric Nurse Practitioner (AGNP) (3)
- ❑ Pediatric Nurse Practitioner (PNP) (4)
- ❑ Certified Nurse Midwife (CNM) (5)

PATIENT & PRACTICE DEMOGRAPHICS

The following section asks questions about the demographics of your practice and patient population. Please answer these questions as best you can from memory.

35. How would you describe your main clinical practice (where you spend most of the time)?
- ❑ Public Health or Community Clinic (1)
- ❑ Private office or clinic (2)
- ❑ Specialized family planning clinic (funded by federal, state, local, or grant money) (3)
- ❑ University clinic or hospital (4)
- ❑ Private hospital clinic (5)
- ❑ Health Department (6)

36. Where is your practice located?
- ❍ City (1)
- ❍ Suburban community or large town (2)
- ❍ Small town (3)
- ❍ Rural area (4)

37. What is the zip code of your practice location?

38. Approximately how many of your patients are . . .? Please give your best estimate.

	None (1)	Some, but less than half (2)	About half (3)	More than half, but not all (4)	All (5)
Privately Insured (1)	❍	❍	❍	❍	❍
Recipients of Medicaid (2)	❍	❍	❍	❍	❍
Recipients of Medicaid for ONLY Pregnancy (3)	❍	❍	❍	❍	❍
Recipients of Medicaid for ONLY Family Planning (4)	❍	❍	❍	❍	❍
Uninsured (5)	❍	❍	❍	❍	❍

39. Approximately how many of your patients are . . .? Please give your best estimate.

	None (1)	Some, but less than half (2)	About half (3)	More than half, but not all (4)	All (5)
Adolescent females (age 15-19) (1)	❍	❍	❍	❍	❍
Adult women of reproductive age (20-49) (2)	❍	❍	❍	❍	❍

LARC TRAINING INTEREST

40. At this time would you be interested in attending a post-graduate LARC training program as part of a contraceptive clinical practice improvement initiative?

❍ Yes (1)

❍ No (2)

41. Please provide any additional comments you have and would like to add to the survey below.

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